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Itineraries of the Working Group for Vegetation Science of the Italian Botanical Society – 1 (2022): Excursion to the Egadi Islands, Mount San Giuliano and Mount Cofano (Trapani, western Sicily, Italy)

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Abstract

The results of the annual excursion of the Working Group for Vegetation Science of the Italian Botanical Society, held in the Egadi Islands, Mount San Giuliano and Mount Cofano (W Sicily) on April 23–27 2022, are presented. This paper includes: (1) general information on the visited sites; (2) geology and geomorphology; (3) climatology and bioclimatology with tables of climatic data; (4) description of the following five geobotanical itineraries – accompanied by 29 original vegetation relevés and 11 synthetic relevés, proceeding from different bibliographic references: (a) Mount San Giuliano; (b) Marettimo Island: coastal and subcoastal stretch of the southern part, between Punta Bassana and Contrada Chiappera; (c) Marettimo Island: Case Romane, Mount Pizzo Falcone and the north-western coastal stretch; (d) Island of Levanzo; (e) Mount Cofano – with catenal pictograms of the vegetation, surveys and description of the plant communities and related syntaxonomic scheme; (5) list of the surveyed plant taxa, collected specimens and herbaria in which they are deposited. A new syntaxon is also described (*Catapodio pauciflori-Moraeetum sisyrinchii* ass. nova), referring to an ephemeral dry grassland located along the north-western coastal stretch of Marettimo. The new association is framed in the *Plantagini-Catapodion balearici*, alliance of the *Stipo-Bupleuretalia semicompositi* order of the class *Stipo-Trachynietea distachyae* (order *Stipo-Bupleuretalia semicompositi*, alliance *Plantagini-Catapodion balearici*). An original synoptic table, regarding 17 different plant communities with high frequency of *Moraea sisyrinchium*, provides a comparative framework of the new association with allied vegetation units so far described throughout the Mediterranean region. Syntaxonomical and nomenclatural remarks regarding the Mediterranean vegetation occurring in this territory are also given throughout the text. Some floristic updates for the study sites are also reported, including the discovery for the first time in Sicily of *Lysimachia loeflingii*.

Keywords

Egadi Island, Phytogeography, Syntaxonomy, Vascular flora, Vegetation, Western Sicily

Introduction

This paper was inspired by the numerous vegetation studies carried out, mainly in the Iberian countries, by Salvador Rivas-Martínez (July 16, 1935–August 27, 2020) and his collaborators and published in the series "Itinera Geobotanica" edited by the Asociación Española de Fitosociología (AEFA). In the present contribution, results of the surveys carried out during an excursion of the Working Group for Vegetation Science of the Italian Botanical Society are presented. The aim is to provide information on the plant communities encountered, as well as on the environmental characteristics of the inspected stands. In particular, representative biotopes have been selected in order to provide opportunities for a critical and comparative study with similar vegetation

aspects occurring in nearby territories. It should be emphasized that one of the main scientific activities envisaged by this Working Group is to improve knowledge on Italian vegetation through field surveys, which allow for the increment of data relating to the syntaxa and their floristic set. Moreover, the phytosociological approach, based on floristic, ecological, structural, and phytogeographic analyses, furthers our knowledge of the correlations within the syndynamic processes that determine a natural evolution of the phytocoenoses.

In the 2022 excursion, which took place from 23 to 27 April, the object of the geobotanical investigation was the extreme western sector of Sicily (Figs 1–3), with guided tours focused on two important and isolated mountain reliefs located along the coast (Mt. San Giuliano and Mt. Cofano), as well as the islands of Marettimo and Levanzo, in the Egadi Archipelago.

Previously, these areas of Sicily were targeted in various phytosociological investigations concerning above all Mt. Cofano (Barbagallo et al. 1979, 1980; Gianguzzi and Ottonello 2000; Gianguzzi and La Mantia 2008) and Marettimo (Brullo and Marcenò 1983) or extended to the whole Province of Trapani (Scuderi 2006) or to Sicily (Brullo et al. 2008; Gianguzzi et al. 2016a; Guarino and Pasta 2017). Further important contributions concern monographic studies on the woody vegetation (Brullo and Marcenò 1985a; Brullo et al. 2008; Marino et al. 2012), the chasmophilous vegetation (Brullo and Marcenò 1979; Brullo et al. 2004), the perennial dry grasslands (Minissale 1995; Brullo et al. 2006, 2010), the coastal rocky vegetation (Bartolo et al. 1992), and the synanthropic vegetation (Brullo and Marcenò 1980, 1985b; Brullo 1985; Brullo et al. 2007).

Concerning the flora, apart from the classic floristic studies by Gussone (1832–34, 1842–45) and Lojacono-Pojero (1888–1909), more recent contributions were made by Giardina et al. (2006) and Brullo et al. (2020), as well as those on Marettimo (Francini and Messeri 1956; Gianguzzi et al. 2006), Levanzo (Di Martino and Trapani 1968; Romano et al. 2006), and Mt. Cofano (Barbagallo et al. 1979, 1980; Gianguzzi et al. 2005). Further data are available from the Province of Trapani (Raimondo et al. 1986, 1990, 1992; Scuderi 2006; Aleo et al. 2013), related floristic reports (e.g. Catanzaro 1984; Brullo and Marcenò 1985b; Ottonello and Catanzaro 1986; Raffaelli and Ricceri 1988; Lorenz and Lorenz 2002; La Rosa et al. 2021; etc.) or descriptions of new species (e.g. Raimondo and Bancheva 2004; Brullo C. et al. 2009; Brullo et al. 2016; Domina et al. 2017, etc.).

The present contribution aims to summarize, in the form of a geobotanical report, the knowledge and critical issues concerning the plant communities identified during the aforementioned annual excursion of our Working Group. Furthermore, syntaxonomic and phytogeographic considerations, that fueled the debate during this field trip in one of the richest biodiversity hotspots of the Mediterranean basin (Médail and Quezel 1999), are reported.

Study area

Mount San Giuliano (791 m a.s.l.) – on the summit of which the town of Erice rises – and Mount Cofano (659 m a.s.l.), located further to the north-east (Munici-

pality of Custonaci), are two important landmarks in NW Sicily. Geologically, they consist of carbonate rocks dating back to the Mesozoic, interspersed with calcarenite substrates originating from Pleistocene bioclastic and aeolian processes (Abate et al. 1993; Lentini and Carbone 2014). As regards the islands of Marettimo (12.3 km^2) and Levanzo (5.6 km2), they are part of the Egadi archipelago, together with Favignana Formica and Maraone, which emerged during the early Miocene, in the period known as the "Egadi Range" (Catalano et al. 1985; Catalano 1986). In particular, Marettimo, dominated by Pizzo Falcone (686 m a.s.l.), is made up of dolomite, marl and limestone dating back to the period between the Middle Trias and the Lower Lias with pelagic and reef facies (Abate et al. 1999; Gasparo Morticelli et al. 2016). Instead, the island of Levanzo is dominated by carbonate and clastic-terrigenous substrates dating back to the Mesozoic and Tertiary, with Plio-Pleistocene and Holocene depositions (Abate et al. 1995).

According to the biogeographical classification proposed by Rivas-Martínez et al. (2004), the study area falls within the Mediterranean Region, West Mediterranean Sub-Region, Italo-Tyrrhenian Province, Sicilian Sector, Western Sub-Sector and Aegadian district (Brullo et al. 1995).

All visited sites belong to the Natura 2000 network as Special Areas of Conservation (SACs), with the following codes: ITA010010 – Mt. San Giuliano; ITA010016

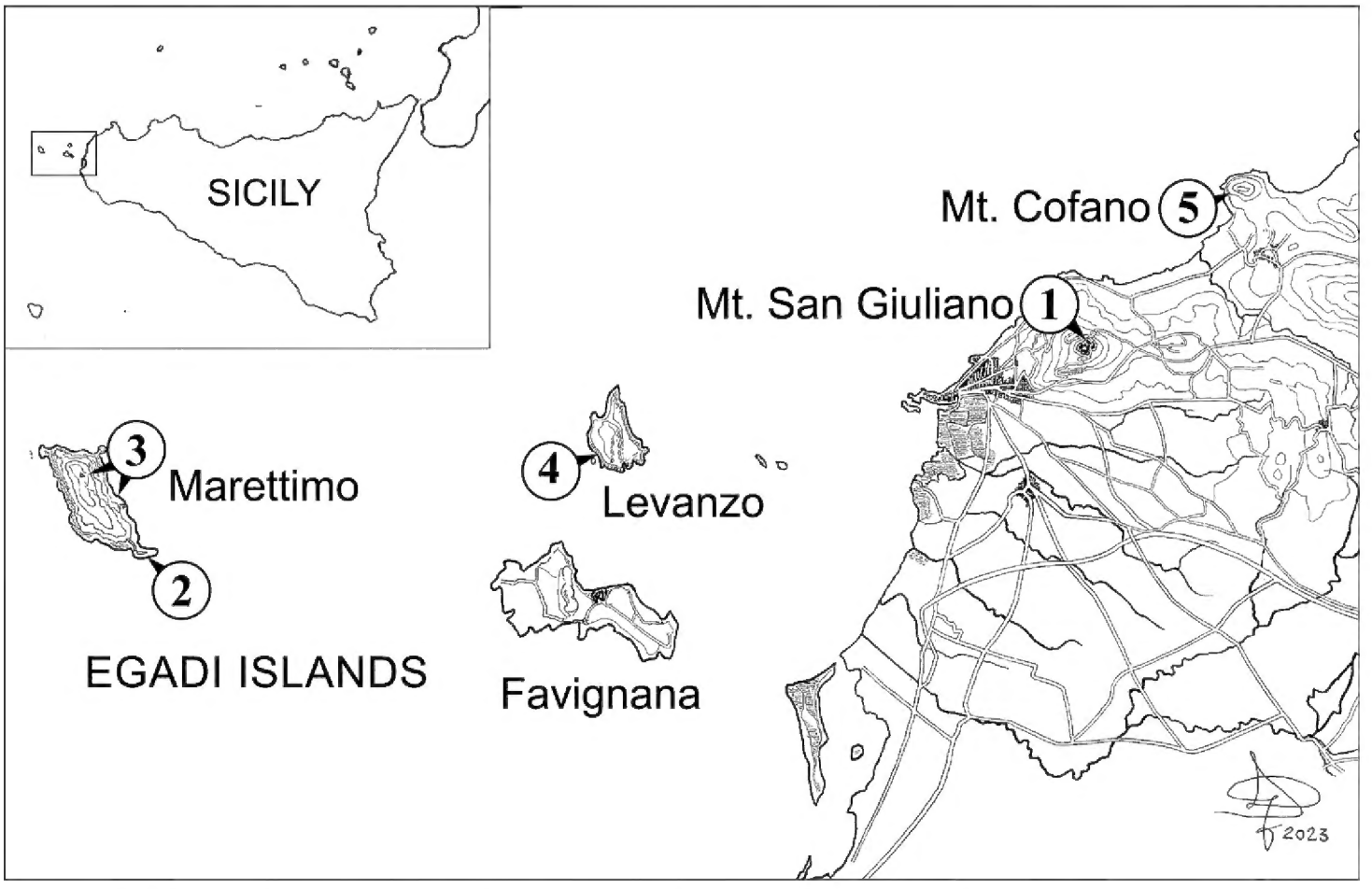

Figure 1. Map of the itineraries of the 2022 annual excursion of the Working Group for Vegetation Science of the Italian Botanical Society, numbered in chronological order. Arrows correspond to the precise location of the sites depicted in Fig. 2.

– Mt. Cofano and its coastline; ITA010002 – Marettimo; ITA010003 – Levanzo. These are also included in the following Special Protection Areas (SPAs): ITA010027 – Egadi Archipelago; ITA010029 – Mount Cofano, Mount San Vito and Mount Sparagio. The area of Mount Cofano is also a Nature Reserve of the Region of Sicily, while the seacoast of Marettimo and Levanzo is part of the "Egadi Islands" Marine Nature Reserve.

Bioclimatology

Due to the lack of meteorological stations in the Egadi archipelago, the climatic records in the area are based on data collected by the Ministry of Public Works (1978–1996) from the thermo-pluviometric or pluviometric stations installed in Capo San Vito (6 m a.s.l.), Trapani (15 m a.s.l.), Sant'Andrea Bonagia (48 m a.s.l.), Lentina (125 m a.s.l.), Specchia (140 m a.s.l.), and Erice (756 m a.s.l.). All these stations are located along the coast, within a radius of 50 km from the center of the study area.

Table 1 reports the annual averages of max. and min. temperatures (in °C), daily temperature ranges, and absolute max. and min. temperatures recorded at the weather stations of Trapani, Capo S. Vito, and Erice. Table 2 shows the average monthly and annual rainfall recorded in the period 1926–1985 of all the aforementioned stations (Duro et al. 1996). The climate throughout the study area is characterized by a rainfall regime of Mediterranean type, with markedly dry summers and mild winters. In particular, Marettimo is rainier than Levanzo, and so is Mt. San Giuliano compared to Mt. Cofano, since fogs and hidden precipitations are frequent on its top. Average annual temperatures vary between 18.1 and 19 °C, gradually decreasing to 14.5 °C on the summit of Mt. San Giuliano. Overall, the proximity of the sea affects significantly the temperatures of the whole area, mitigating the climatic extremes.

Based on the bioclimatic classification proposed by Rivas-Martínez (2004), the study areas are arranged in the following units:

1. Mt. San Giuliano – From thermo-Mediterranean with lower sub-humid ombroclimate (coastal plain) to Meso-Mediterranean with upper sub-humid ombroclimate on the top (Gianguzzi and La Mantia 2008).
2. Mt. Cofano – From thermo-Mediterranean with lower sub-humid ombroclimate (coastal plain) to Meso-Mediterranean with upper sub-humid ombroclimate on the top (Gianguzzi and La Mantia 2008);
3. Marettimo – From thermo-Mediterranean with dry/sub-humid ombroclimate to Meso-Mediterranean with sub-humid ombroclimate above 400–550 m altitude (Gianguzzi et al. 2006);
4. Levanzo – Thermo-Mediterranean with upper dry ombroclimate (Romano et al. 2006).

Table 1. Annual averages of max., min. and diurnal temperatures (in °C), daily temperature range, absolute max. and min. temperatures recorded at the weather stations of Trapani (15 m a.s.l.), Capo S. Vito (15 m a.s.l.) (Duro et al. 1996) and Erice (759 m a.s.l.) (Ministero dei LL. PP. 1978–1996).

Station	Av. max.	Av. min	Av. diurnal	Daily range	Absolute max.	Absolute min.
Trapani	21.7	14.4	18.1	7.3	41.8	0.1
Capo S. Vito	22.4	15.5	19.0	6.9	43.0	2.4
Erice	17.5	11.9	14.5	5.6	41.0	-2.7

Table 2. Average monthly and annual rainfall and number of rainy days (r.d.) recorded at the weather stations of Trapani, Capo San Vito, Sant'Andrea Bonagia, Lentina, Specchia (1926–1985; after Duro et al. 1996) and Erice (1978–1996; after Ministero dei LL. PP. 1978–1996).

Month	Trapani (15 m a.s.l.)		Capo S. Vito (6 m a.s.l.)		S. Andrea B. (48 m a.s.l.)		Lentina (125 m a.s.l.)		Specchia (140 m a.s.l.)		Erice (756 m a.s.l.)	
	mm	r.d.	mm	r.d.	mm	r.d.	mm	r.d.	mm	r.d.	mm	r.d.
January	64.2	10	68.4	9	75.0	10	88.6	11	80.3	11	81.7	10
February	50.8	8	58.6	8	65.6	9	77.6	10	71.6	10	61.8	10
March	44.1	7	42.8	6	60.0	8	56.7	8	49.8	8	71.9	10
April	34.4	5	35.1	5	42.2	6	44.4	6	36.2	5	72.6	8
May	19.2	3	18.1	2	22.6	3	24.6	3	18.5	3	35.2	5
June	8.0	1	5.6	1	8.9	1	6.7	1	7.6	1	6.5	2
July	1.7	–	3.2	–	2.6	-	1.8	–	2.3	–	4.0	–
August	9.5	1	9.1	1	15.1	1	9.4	1	10.5	1	10.0	1
September	35.3	3	41.6	3	55.7	4	47.2	4	41.3	4	49.3	4
October	71.1	7	71.2	7	89.3	7	90.0	8	83.3	8	90.6	7
November	69.6	8	66.7	8	85.1	9	95.3	9	75.1	8	86.4	10
December	75.1	11	82.0	10	78.6	11	96.5	12	83.3	11	82.0	11
Year	**483**	**64**	**502.4**	**60**	**602.7**	**69**	**637.8**	**73**	**559.8**	**70**	**651.3**	**78**

Materials and methods

Bioclimatic units are based on Rivas-Martínez's classification (2004); indices were calculated on data extracted from Drago et al. (2005) and Duro et al. (1996). Reference was made also to Gianguzzi and La Mantia (2008), Bazan et al. (2015), and Gianguzzi et al. (2016b).

Following the phytosociological approach (Braun-Blanquet 1964), 29 original relevés and 11 synthetic relevés, elaborated from different bibliographic references regarding the study area, were carried out. The syntaxonomic classification refers to different contributions cited throughout the text.

The floristic lists of collected or observed taxa from Mt. San Giuliano, Marettimo, Levanzo, and Mt. Cofano are reported in Suppl. materials 1, 2, 3, and 4, respectively. New floristic records are highlighted with a note in the tables provided in the Suppl. materials 1–4.

The collected plant material is preserved in public (FI, HFLA, HLUC, IS, IT, the acronyms follow Thiers 2023), or private herbaria (Herb. G. Mei). The identification of the plant specimens was based on Pignatti et al. (2017–2019). Taxonomic nomenclature follows the checklists of the Italian vascular flora (Bartolucci et al. 2018;

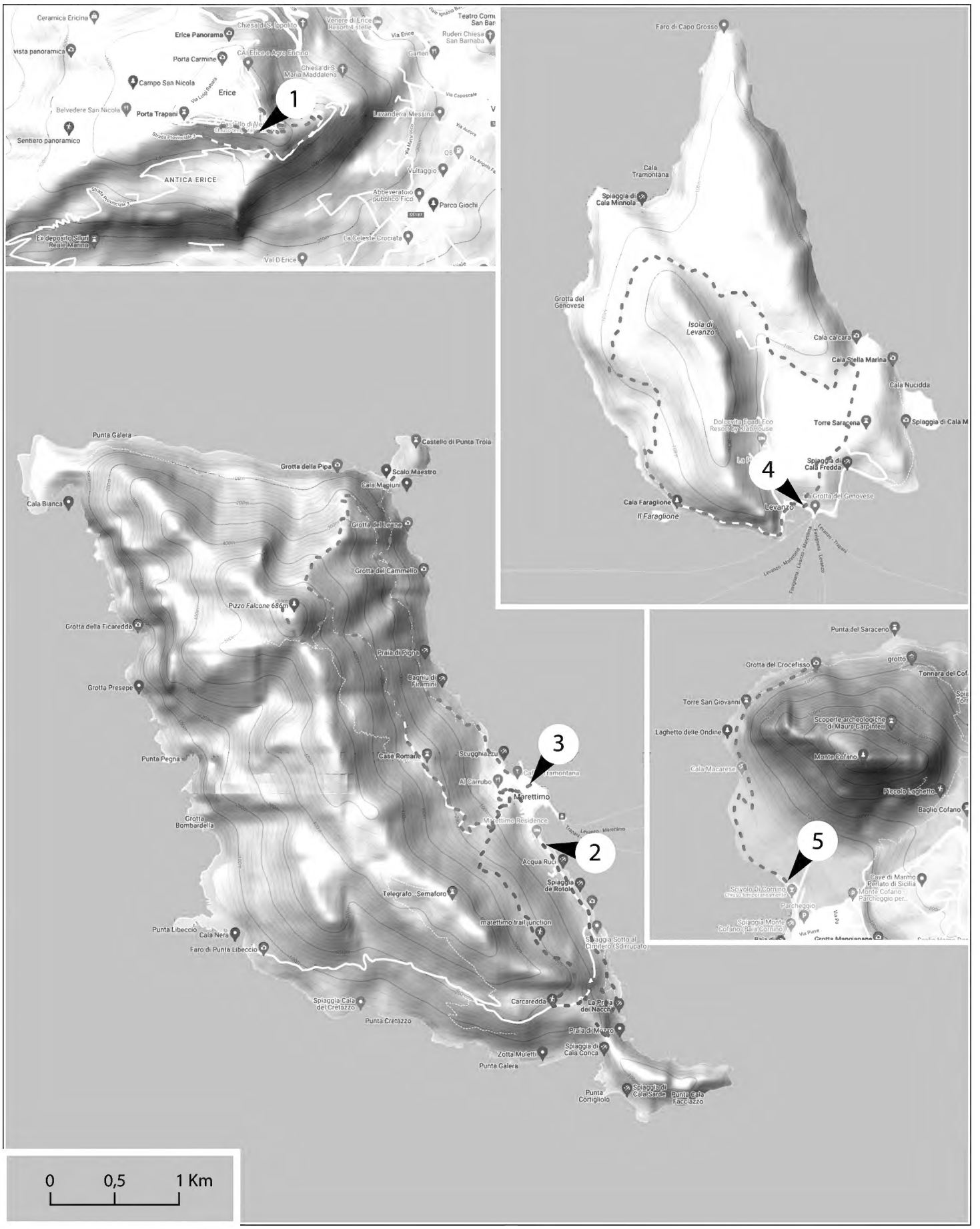

Figure 2. Tracks of the itineraries of excursions to Mount San Giuliano (**1**), Marettimo island (**2, 3**), Levanzo island (**4**), and Mount Cofano (**5**). All maps have the same cartographic scale (basemap provided by Google Terrain).

Galasso et al. 2018) and their updates available on the Portal to the Flora of Italy (2023), apart from: *Coronilla valentina* L. subsp. *glauca* (L.) Batt., *Hyoseris baetica* Sch. Bip. ex Nyman, *Reichardia picroides* (L.) Roth var. *maritima* (Boiss.) Fiori [Pignatti et al. 2017–2019; Gianguzzi et al. 2006], *Senecio aegadensis* C. Brullo et Brullo

(Brullo and Brullo 2020) [= *Senecio leucanthemifolius* Poir. subsp. *leucanthemifolius*], *Helichrysum panormitanum* Tineo ex Guss. subsp. *messeriae* (Pignatti) C. Brullo et Brullo and subsp. *brulloi* Iamonico et Pignatti (Iamonico et al. 2016; Brullo and Brullo 2020), and *Lysimachia loeflingii* (Jiménez-Lopez et al. 2022). For the taxa not belonging to the flora of Italy, cited in Table 4, the World Flora Online (2023) was followed.

Excursion to Mount San Giuliano (23 April 2022): Erice, Venus Castle, trail surrounding the castle

Mt. San Giuliano (786 m a.s.l.) is located near Trapani; it has an almost triangular shape, with rather steep southern and eastern slopes and a less abrupt morphology on north and north-western flanks, which are interrupted by stepped faults (Lentini and Carbone 2014). Despite the anthropic pressure exerted on it since ancient times, this mountain has a high naturalistic value and is often mentioned as one of the biotopes with the highest biodiversity in Sicily.

Land use – Erice, on the summit of Mt. San Giuliano, is an ancient town founded by the Elymians, which dominates a landscape now altered by various anthropic disturbances. In particular, the higher areas are covered by extensive reforestation with conifers, which are periodically subject to fires, while the rest of the area is characterized by low secondary shrublands, represented by maquis (dominated by *Chamaerops humilis* or *Cytisus infestus*) and garrigues (dominated by *Thymbra capitata*, and *Erica multiflora*), by steppic grasslands with *Hyparrhenia hirta* subsp. *hirta* or *Ampelodesmos mauritanicus*, and by ephemeral meadows, usually interspersed with rocky outcrops colonized by several endemic chasmophytes. Limited patches of woody vegetation dominated by holm oak or laurel occur in cooler microclimate stands of the northern slope.

Series and microgeoseries – The basal xeric belt of Mt. San Giuliano is mainly represented by maquis with lentisk and dwarf palm (*Pistacio lentisci-Chamaeropo humilis* sigmetum), lithophilous climatic vegetation linked to very sunny and arid stands especially with southern exposure. In conditions of marked edaphic xerity, as in the more rocky stands, it is sometimes replaced by an oleaster series ascribed to *Ruto chalepensis-Oleo sylvestris* sigmetum, which shows a scattered distribution and can be traced back to remains of ancient olive groves long since abandoned and now gone wild, which were saved from fires and cuts. This plant community is here represented by the *Ruto chalepensis-Oleetum sylvestris* subass. *euphorbietosum bivonae* (Gianguzzi and Bazan 2020a, 2020b). The semi-rupestrian rock outcrops are usually colonized by the *Euphorbia dendroides* maquis, which must be considered as an edapho-xerophilous community in contact with chasmophilous associations. Among the secondary plant communities occurring in this belt, xeric grasslands with *Hyparrhenia hirta* subsp. *hirta* (*Hyparrhenietum hirto-pubescentis* s. l.) and therophytic meadows of the class *Stipo-Trachynietea distachyae* must be mentioned.

The holm oak series (*Pistacio lentisci-Querco ilicis* sigmetum) develops within the upper belt, influenced by the Thermo- to Meso-Mediterranean subhumid bioclimate.

Figure 3. a Participants to the escursion (Erice, 23 April 2022) **b** view of the northern summit of Mt. San Giuliano, next to Torretta Pepoli, with stands of rupestrian and forest vegetation **c** the local endemic *Centaurea erycina*, character species of *Scabioso creticae-Centauretum ucriae* subass. *brassicetosum drepanensis* **d** view of the village of Marettimo surrounded by formerly terraced fields and by the rugged landscape of the island **e** view of the *Erico multiflorae-Pinetum halepensis*, with Punta Bassana in the background **f** vegetation of *Limonietum tenuiculi*, fringing the rocky shore of Marettimo.

It is represented by the following vegetation units: climatophilous woodland with *Quercus ilex* and *Pistacia lentiscus* (*Pistacio lentisci-Quercetum ilicis*); scrub with *Chamaerops humilis* (*Pistacio-Chamaeropetum humilis*) and/or *Cytisus infestus* (*Pyro amygdaliformis-Calicotometum infestae*); garrigue with *Erica multiflora* (*Micromerio fruticulosae-Ericetum multiflorae* corr. = *Erico-Micromerietum fruticulosae*); perennial dry grassland with *Ampelodesmos mauritanicus* (*Helictotricho convoluti-Ampelodesmetum mauritanici*); nitrophilous hemicryptophytic vegetation (*Carlino siculae-Feruletum communis*); therophytic meadow with *Stipellula capensis* (*Ononido breviflorae-Stipetum capensis*).

In this belt, other more circumscribed series occur, such as that of the chestnut oak series (*Oleo-Querco virgilianae* sigmetum, see Brullo and Marcenò 1985a; Brullo et al. 2008; Di Pietro et al. 2020a, 2020b) on deep and evolved soils, mainly represented by secondary plant communities on abandoned cropland, as well as the laurel series (*Acantho-Lauro nobilis* sigmetum), on cooler stands, such as gorges with a northern exposure. Lastly, the microgeosigmetum of cliffs, with associations of the alliance *Dianthion-rupicolae* (*Asplenietea trichomanis*), must be mentioned. The intricate issue regarding the taxonomic identity of the thermophilous pubescent white oaks of Sicily and southern Italy has been addressed by several authors (Brullo et al. 1999; Guarino et al. 2015; Wellstein and Spada 2015; Di Pietro et al. 2016; Pasta et al. 2016; Musarella et al. 2018; Di Pietro et al. 2020a, 2020b, 2021).

Endemic and rare species – Several endemic taxa thrive on Mt. San Giuliano, such as *Dianthus rupicola* subsp. *rupicola* (Tyrrhenian endemic) and *Micromeria graeca* subsp. *fruticulosa* (endemic to western Sicily, the island of Capri, and the Sorrento peninsula). Mt. San Giuliano is the locus classicus of *Brassica villosa* subsp. *drepanensis*, with a few other stands on Mt. Cofano and Capo San Vito, *Centaurea erycina* (Fig. 3c), (Raimondo and Bancheva 2004), and *Silene nefelites* (Brullo et al. 2014). A few other rare, non-endemic, species, namely *Simethis mattiazzi* a Mediterranean-Atlantic species (Gianguzzi et al. 2012), *Chamaeiris foetidissima*, *Vinca major*, and *Prunus mahaleb*, were recorded in the upper part of Mt. San Giuliano, where they take advantage of the humidity due to moisture condensation and frequent fogs rising from the sea.

Sampled plant communities

The first stopover was in the town of Erice, where it was possible to observe *Silene nefelites*, an endemic therophyte widespread along the roadside, as well as the chasmophytic vegetation colonizing the walls of the Castle of Venus and the nearby carbonate rocky outcrops. This chasmophytic community is referred to the Sicilian-Tyrrhenian association of the *Dianthion rupicolae*, *Scabioso creticae-Centauretum ucriae* subass. *brassicetosum drepanensis* (see Brullo et al. 2004), a relevé of which is reported below.

Scabioso creticae-Centauretum ucriae* subass. *brassicetosum drepanensis – Erice (38°02'25"N, 12°35'27"E): 627 m, 80°, N, 100 m². Diagnostic species: *Lomelosia cretica* 2, *Brassica villosa* subsp. *drepanensis* 2, *Centaurea erycina* 1. Characteristics of alliance, order and class: *Dianthus rupicola* subsp. *rupicola* 1, *Silene fruticosa* 2. Other species: *Athamanta sicula* +, *Sedum dasyphyllum* subsp. *glanduliferum* +,

Umbilicus rupestris +, *Asplenium ceterach* +, *Polypodium cambricum* 1, *Hypochoeris laevigata* 1, *Micromeria graeca* subsp. *fruticulosa* +, *Hyoseris radiata* +, *Campanula erinus* +, *Sedum caeruleum* +, *Muscari commutatum* +, *Veronica cymbalaria* +.

The *Scabioso creticae-Centauretum ucriae* is widespread on the cliffs of the mountains forming the north-western strip of the coast of Trapani. However, the stands observed in Erice differ from the typical ones for the lack of some endemic species, such as *Iberis semperflorens* and *Seseli bocconei*.

Paucispecific, subnitrophilous and sciaphilous wall vegetation, characterized by hemicryptophytes such as *Parietaria judaica* and *Athamanta sicula* is frequent on the old walls of Erice. It can be referred to *Athamanto siculae-Parietarietum*, an association of the alliance *Parietarion judaicae*, described from Monte Pellegrino (Palermo) by Gianguzzi and Bazan (2020c), which is quite frequent along the coasts of western Sicily. A relevé, sampled in the town of Erice, is reported below.

Athamanto siculae-Parietarietum judaicae – Erice, north-eastern city walls (38°02'12"N, 12°35'25"E): 740 m, 90°, E, 8 m^2. Diagnostic species: *Parietaria judaica* 3, *Atamantha sicula* 2, *Campanula erinus* +. Characteristics of alliance, order and class: *Sedum dasyphyllum* subsp. *glanduliferum* 1, *Umbilicus rupestris* +, *Cymbalaria muralis* +. Other species: *Hypochoeris laevigata* +, bryophytes (+).

Along the north-eastern side of Erice, near the Torre Pepoli, a path descends all around the cliff on which the Castello di Venere is built (Figs 2, 3b). In this place, patches of pre-forest vegetation with *Laurus nobilis*, referred to the association *Acantho mollis-Lauretum nobilis* (Gianguzzi et al. 2010), were observed. It is a vegetation linked to cool and shady places within the Meso-Mediterranean sub-humid bioclimatic belt. The relevé reported below was sampled on a steep slope, with a clay-limestone matrix, next to the cliffs, in an area that is highly exposed to moisture condensation.

Acantho mollis-Lauretum nobilis – Erice, below the cliffs near Torretta Pepoli (38°02'08"N, 12°35'29"E): 726 m, 80°, N, 100 m^2. Diagnostic species: *Laurus nobilis* 4, *Hedera helix* 3, *Acanthus mollis* 2, *Orobanche hederae* +, *Cyclamen hederifolium* +. Characteristics of alliance, order and class: *Rubia peregrina* 1, *Asparagus acutifolius* 1, *Rosa sempervirens* 2, *Ruscus aculeatus* 1, *Euphorbia characias* +, *Lonicera etrusca* 1, *Chamaeiris foetidissima* 2, *Clematis vitalba* 1, *Fraxinus ornus* 2, *Allium subhirsutum* 1. Other species: *Rubus ulmifolius* 2, *Crataegus monogyna* 1, *Ficaria verna* 1, *Arum italicum* 1, *Smyrnium olusatrum* 1, *Parietaria judaica* + (Gianguzzi et al. 2016a).

Syntaxonomical note – The association *Acantho mollis-Lauretum nobilis* belongs to the alliance *Asparago acutifolii-Laurion nobilis*; it is locally characterized by *Ficus carica*, *Celtis australis*, *Asparagus acutifolius*, *Clematis vitalba*, *Cyclamen hederifolium*, *Ulmus minor*, and *Orobanche hederae*. This association was described by Gianguzzi et al. (2016a) to define the micro-woods rich in laurel, widespread in Italy and in the large central-Mediterranean islands. Compared to the alliance *Arbuto unedonis-Laurion nobilis*, described for the Iberian Peninsula by Rivas-Martinez et al. (2001, 2002), framed in the order *Pistacio-Rhamnetalia alaterni*, the *Asparago acutifolii-Laurion nobilis* is more mesophilous and, therefore, it can be included in the order *Quercetalia ilicis* (Gianguzzi et al. 2016a; Rivieccio et al. 2021).

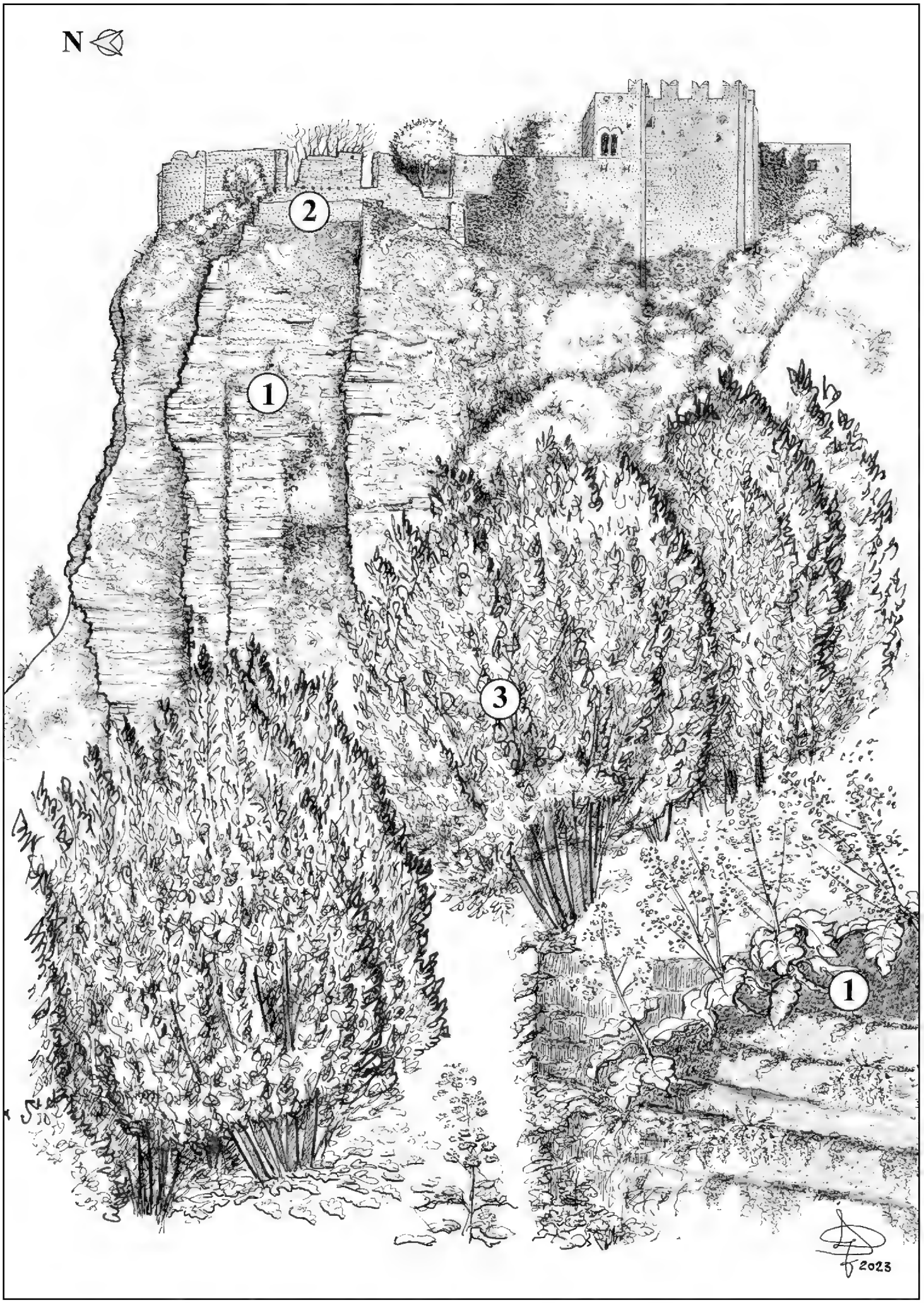

Figure 4. Mount San Giuliano: vegetation near Torretta Pepoli (38°02'08"N, 12°35'29"E; 730 m a.s.l.); in the background the Castle of Venus (Erice) – **1** *Scabioso creticae-Centauretum ucriae* subass. *brassicetosum drepanensis*; **2** subnitrophilous and subsciaphilous wall vegetation (*Athamanto siculae-Parietarietum judaicae*); **3** *Acantho mollis-Lauretum nobilis*.

Excursion to Marettimo Island I (24 April 2022): coastal and sub-coastal stretch of the southern part of the island, between Punta Bassana and Contrada Chiappera

The island of Marettimo (Fig. 2) – as seen from the hydrofoil arriving from Trapani (Fig. 3d) – appears as a rather rugged and uneven ridge, with Pizzo Falcone (686 m a.s.l.) towering on a system of other peaks sloping both northwards [Pizzo delle Fragole (538 m a.s.l.) and Capo Bianco (470 m a.s.l.)] and southwards [Pizzo del Capraio (626 m a.s.l.), Punta Campana (629 m a.s.l.), Punta Anzine (493 m a.s.l.) and Pizzo Nido Falcone (490 m a.s.l.)]. The steep slopes of the island are interrupted by torrential incisions and by imposing rock walls scattered all along the island's ridge, as well as in the localities named Libbano, Bassano, Orru Chiàppara, etc.

The island is characterized by very peculiar plant communities, which host many taxa of phytogeographic relevance, some of which endemic to the island. This is explained by its long geographical isolation, positioned at the extreme western limit of the Egadi archipelago and ca. 35 km from the Sicilian coasts, with isobaths between -100 and -350. Besides, during the last glacial maximum (20–18.00 years ago) it remained isolated from Sicily, unlike the other islands of the archipelago, which were, instead, united with Sicily (Agnesi et al. 1993). Therefore, Marettimo can be considered as a refuge area for numerous taxa missing in Sicily and in the rest of the archipelago.

On the other hand, some species that are quite frequent in Sicily are missing in Marettimo, such as *Rubus ulmifolius* Schott and other shrubs of the class *Crataego-Prunetea*, as well as species typical of dry grasslands, such as *Stipellula capensis*, which is represented on the island by very few individuals, probably of recent anthropogenic introduction. From a phytogeographical point of view, it is important to underline the possible connections with the African coast through a submerged ridge whose depth never goes below 350 m (Hofrichter 2001). Therefore, Marettimo probably acted as a stepping stone for various North African species that spread into the central part of the Mediterranean basin since the Messinian salinity crisis.

Land use – The agro-silvo-pastoral activities that existed until recently on the island have gradually led to the disappearance or rarefaction of the woodlands that previously covered its slopes. However, it should be noted that Marettimo, unlike other Mediterranean territories, does not seem to have suffered the devastating impact of periodical fires, with positive consequences on the natural vegetation. Furthermore, the activity of woodcutters, quite widespread on the island until 60 years ago, has now disappeared, and agricultural and pastoral activities have been gradually abandoned during the last decades. In the past, the whole island was exploited for the production of wood; deforestation and clearing was carried out on a large scale, with timber and fagots transported downstream using cableways, loaded directly onto boats and sold as firewood in the nearby coastal town of Trapani. Overall, the interruption of human activities and the absence of fires has brought about a significant advance in the evolution of the natural landscape.

The recent land-use change has led to both qualitative and quantitative variations in floristic and phytocoenotic diversity, through the progressive rarefaction, and sometimes disappearance, of species linked to crop and rural activities, once consisting of small peach orchards, olive groves and – to a lesser extent – vineyards, or ash groves, as well as wheat or leguminous crops (*Vicia faba* L., *Cicer arietinum* L., etc.). This is countered by the recent random introduction of allochthonous species, particularly in the proximity of the village and tourist infrastructure (Gianguzzi et al. 2006).

Series and microgeoseries – On south-exposed coastal slopes, frequently affected by the sirocco wind, the infra-Mediterranean edapho-xerophilous series of *Periploco-Euphorbio dendroidis* sigmetum is recognisable. On cracked rocky slopes and clastic substrates, within the thermo-Mediterranean Dry bioclimate, especially on the western and southwestern slopes of the island, the *Ruto chalepensis-Oleo sylvestris rhamno oleoidis* sigmetosum replaces the previously mentioned series. The head of the series is a maquis referred to the *Ruto chalepensis-Oleetum sylvestris* subass. *rhamnetosum oleoidis* (Gianguzzi and Bazan 2020a, 2020b); secondary aspects are represented by a low shrubland with *Euphorbia dendroides* and *Rhamnus lycioides* subsp. *oleoides* (*Rhamno alaterni-Euphorbietum dendroidis* subass. *rhamnetosum oleoidis*), as well as xerophilous grassland with *Hyparrhenia hirta* subsp. *hirta* (*Hyparrhenietum hirto-pubescentis* s.l.) and therophytic grasslands of the class *Stipo-Trachynietea distachyae*. The thermo-Mediterranean Dry to Subhumid belt is, however, dominated by the *Erico multiflorae-Pino halepensis* sigmetum, a pine forest series linked to more or less consolidated talus slopes at the base of the rocky cliffs. Upwards, within the Meso-Mediterranean Sub-humid bioclimatic belt, the holm oak series of the *Pistacio lentisci-Querco ilicis* / *Daphno sericeae-Querco ilicis* sigmetum occurs (see further on in the text for further explanations on the intricate question of the syntaxonomy of the holm oak woods of Marettimo). Currently, the limited residual patches of these woodlands are located in impervious stands near Pizzo Campana, as well as between Mt. Falcone and Pizzo delle Fragole, where the evolutionary processes of recolonization are clearly recovering, after the extensive deforestation implemented in the past (Gianguzzi et al. 2003a, b).

Among the secondary vegetation units, the garrigue with *Salvia rosmarinus* and *Erica multiflora*, ascribed to the association *Micromerio fruticulosae-Ericetum multiflorae* (Brullo and Marcenò 1983), is dominant throughout the island. It occupies large areas up to the highest parts of the island, interfering with the different vegetation series present there, with some local floristic variants, depending on particular ecological conditions. In fact, in addition to the subassociation *typicum*, other variants can be recognised, characterized by *Coronilla valentina* subsp. *glauca* and *Globularia alypum*, or by *Thymbra capitata*, or by *Cistus monspeliensis* and *Cistus salviifolius*. Along the ravines to the north of the village, there are shrublands with *Myrtus communis*, indicating a certain edaphic humidity. In the higher stands, a shrubby vegetation characterized by two rare relict taxa, *Daphne sericea* and *Thymelaea tartonraira*, occurs. These two species are completely missing from the rest of the Sicilian territories. In Marettimo, *Salvia rosmarinus* also reaches elevations that are quite unusual in Sicily, where this species is

limited to small residual sites near the coastline. This is probably due to isolation of the island even during the last glacial maxima, thus preserving it from climate change-related plant migrations.

The chasmophilous vegetation of *Bupleuro dianthifolii-Scabiosetum limonifoliae* is also rich in endemic or rare species, as well as the plant communities occurring on the rocky coasts, represented by the *Limonietum tenuiculi*, *Senecioni bicoloris-Helichrysetum messerii* and *Agropyro scirpei-Inuletum crithmoidis*.

Endemic and rare species – According to literature data (Gianguzzi et al. 2006; Scuderi 2008; Brullo C. et al. 2009), the vascular flora of Marettimo consists of 499 taxa. There are eight species endemic to the island, three of which are palaeoendemic (*Oncostema ughii*, *Bupleurum dianthifolium*, *Thymus richardii* subsp. *nitidus*) and five schizoendemic (*Allium franciniae*, *Helichrysum panormitanum* subsp. *messeriae*, *Limonium tenuiculum*, *Prospero hierae* and *Senecio aegadensis*). In addition, another narrow-ranging paleoendemic species limited to the islands of Marettimo and Favignana, *Brassica macrocarpa*, occurs. Other endemic species with a distribution including the Sicilian territory are: *Hexaphylla rupestris*, *Bellevalia dubia*, *Carlina sicula*, *Euphorbia papillaris*, *Plantago afra* subsp. *zwierleinii*, *Pseudoscabiosa limonifolia*, *Ranunculus spicatus* subsp. *rupestris*, *Jacobaea maritima* subsp. *sicula*, and *Seseli bocconei*. Some other endemics have a wider Tyrrhenian range, such as *Crocus longiflorus*, *Daucus carota* subsp. *drepanensis*, *Dianthus rupicola* subsp. *rupicola*, *Iberis semperflorens*, *Glandora rosmarinifolia*, *Pimpinella anisoides*, *Micromeria graeca* subsp. *fruticulosa*, *Anthemis secundiramea*, etc. The island also hosts species of biogeographical interest, that are either completely absent or very rare in the rest of Sicily, such as *Aristolochia navicularis*, *Daphne sericea*, *Erodium maritimum*, *Lagurus ovatus* subsp. *vestitus*, *Periploca angustifolia*, *Reichardia tingitana*, *Simethis mattiazzi*, *Thymelaea tartonraira*, and others.

Sampled plant communities

Moving from the town of Marettimo towards the southern part of the island, there is a relatively flat stretch of coastline, which is very different from the rest of the island, characterised by cliffs and crags that are rather steep and not always accessible (Fig. 5). Along this coast, it is possible to observe halophilous and scattered vegetation, represented towards the sea by the *Limonietum tenuiculi*, widespread throughout the island, both on low coasts and sea-facing cliffs (Fig. 3f).

Limonietum tenuiculi (After Brullo and Marcenò 1983: tab. 1, rels 1–13) – Diagnostic species: *Limonium tenuiculum* V, *Senecio aegadensis* IV, Characteristics of alliance, order and class: *Crithmum maritimum* V, *Daucus carota* subsp. *drepanensis* V, *Lotus cytisoides* V, *Silene sedoides* V, *Reichardia picroides* var. *maritima* V, *Plantago macrorhiza* III, *Jacobaea maritima* subsp. *sicula* III, *Frankenia hirsuta* III. Other species: *Catapodium pauciflorum* IV, *Anthemis secundiramea* IV, *Hyoseris radiata* III, *Parapholis incurva* II, *Limbarda crithmoides* subsp. *longifolia* II, *Euphorbia segetalis* II, *Bellis annua* II, *Ranunculus paludosus* II, *Sagina maritima* II, *Hornungia procumbens* II, *Plantago coronopus* I, *Trifolium scabrum* I, *Arthrocaulon meridionale* I.

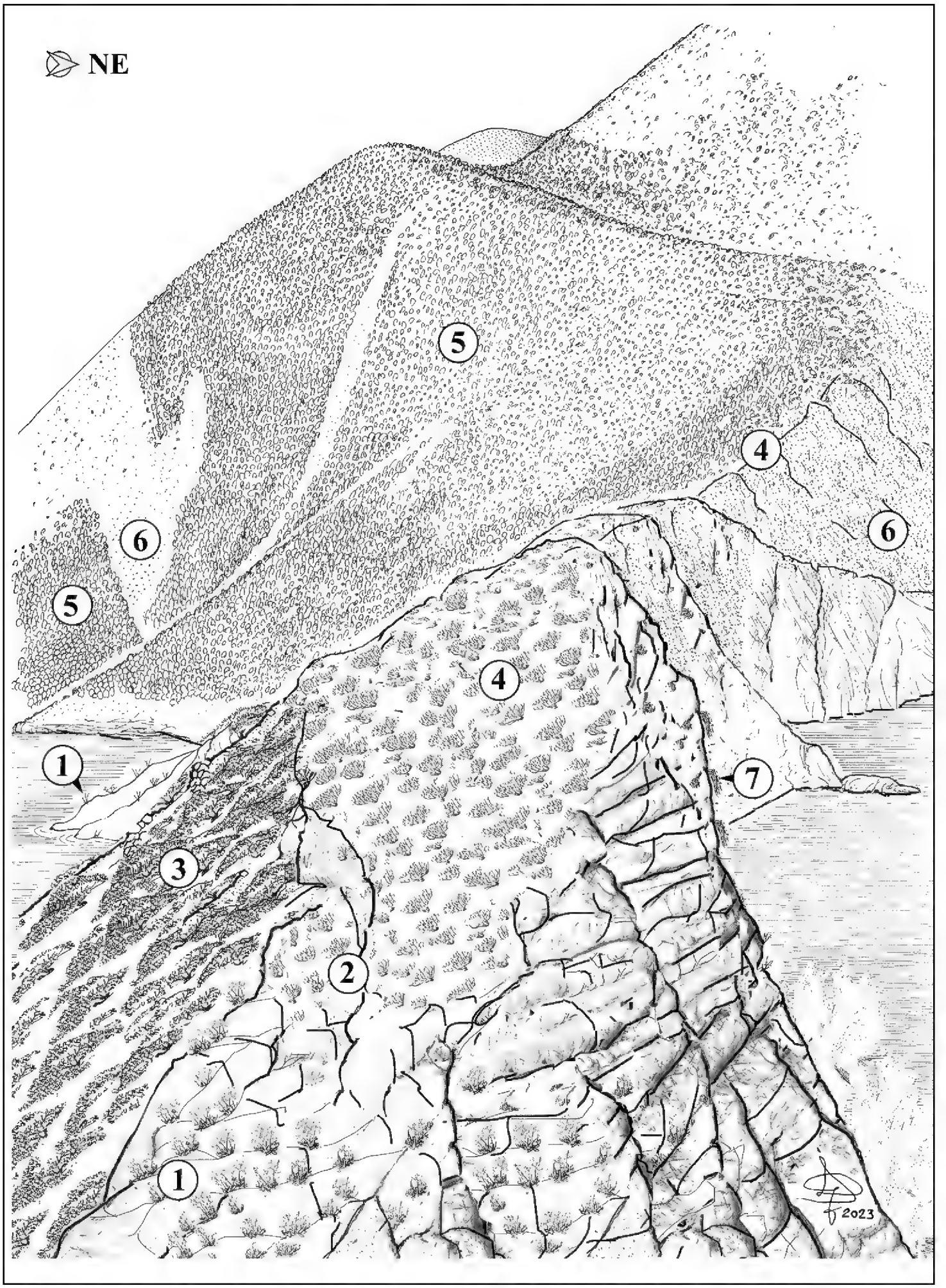

Figure 5. Vegetation along the slopes of Marettimo (southern cape) between Punta Bassana and Pizzo Spirone (37°56'52"N, 12°05'25"E; 53 m a.s.l.) – **1** *Limonietum tenuiculi*; **2** *Senecioni bicoloris-Helichrysetum messerii*; **3** *Periploco angustifoliae-Euphorbietum dendroidis*; **4** *Micromerio fruticulosae-Ericetum multiflorae* var. *typicum*; **5** *Erico multiflorae-Pinetum halepensis*; **6** *Oleo sylvestris-Pistacietum lentisci*; **7** *Bupleuro dianthifolii-Scabiosetum limonifoliae*.

Along the landward gradient, the *Limonietum tenuiculi* is replaced by *Senecioni bicoloris-Helichrysetum messerii* is found next, characterized by the silvery cushions of the dominant species. This plant community is more frequent along the north-east facing coast, in the upper part of the coastal cliffs, forming an ecotone between the halo-tolerant vegetation and the coastal garrigue or other inland vegetation.

Senecioni bicoloris-Helichrysetum messerii (After Brullo and Marcenò 1983: tab. 2, rels 1–10) – Marettimo, a little beyond the cemetery: 10 m., 8°, NE, 50 m^2. Diagnostic species: *Helichrysum panormitanum* subsp. *messeriae* V, *Jacobaea maritima* subsp. *sicula* V, *Polycarpon tetraphyllum* subsp. *alsinifolium* V. Characteristics of alliance, order and class: *Daucus carota* subsp. *drepanensis* V, *Crithmum maritimum* V, *Lotus cytisoides* V, *Reichardia picroides* var. *maritima* IV, *Catapodium balearicum* IV, *Plantago macrorhiza* V, *Limonium tenuiculum* IV, *Anthemis secundiramea* IV, *Senecio aegadensis* IV, *Silene sedoides* III, *Thymelaea hirsuta* I. Other species: *Dactylis glomerata* subsp. *hispanica* V, *Hyoseris radiata* V, *Euphorbia segetalis* IV, *Catapodium balearicum* IV, *Trifolium scabrum* III, *Brachypodium distachyon* III, *Stachys romana* III, *Parapholis incurva* II, *Erica multiflora* III, *Catapodium rigidum* III, *Romulea bulbocodium* II, *Linum strictum* II, *Carlina sicula* II, *Pallenis spinosa* I, *Coronilla valentina* subsp. *glauca* I, *Euphorbia dendroides* I, *Limbarda crithmoides* subsp. *longifolia* II, *Bellis annua* II, *Pistacia lentiscus* I.

The southern slopes of Punta Bassana, characterised by clay-limestone substrates, are rather xeric and strongly affected by dry southerly winds, particularly the sirocco. These are colonized by a low scrub dominated by *Periploca angustifolia* and *Euphorbia dendroides*, accompanied by a few other species of the order *Pistacio-Rhamnetalia alaterni* and of the class *Quercetea ilicis*, as shown in the relevé below.

Periploco angustifoliae-Euphorbietum dendroidis – Punta Bassana (37°57'01"N, 12°04'50"E): 81 m, 30°, S, 40%, 100 m^2. Diagnostic species: *Periploca angustifolia* 3, *Euphorbia dendroides* 2. Characteristics of alliance, order and class: *Teucrium fruticans* 1, *Olea europaea* var. *sylvestris* 1, *Clematis cirrhosa* +, *Ruta chalepensis* +. Other species: *Salvia rosmarinus* 2, *Erica multiflora* 2, *Micromeria graeca* subsp. *fruticulosa* +, *Dactylis glomerata* subsp. *hispanica* +, *Squilla pancration* +.

An aspect of degradation of the above-mentioned maquis is represented by a thinned garrigue, which can be ascribed to the *Micromerio fruticulosae-Ericetum multiflorae* (Fig. 8e); a relevé of this vegetation is reported below.

Micromerio fruticulosae-Ericetum multiflorae **var. *typicum*** – Ridge of Punta Bassana (37°57'04"N, 12°04'49"E): 86 m, 30°, SSE, 40%, 40 m^2. Diagnostic species: *Salvia rosmarinus* 3, *Erica multiflora* 2, *Micromeria graeca* subsp. *fruticulosa* +, Characteristics of alliance, order and class: *Fumana thymifolia* 1, *Cuscuta epithymum* +, *Phagnalon rupestre* +. Other species: *Pistacia lentiscus* 1, *Glandora rosmarinifolia* +.

Moving along the path that leads from Punta Bassana towards Carcaredda (180 m a.s.l.) and proceeding along the base of Pizzo Spirone (333 m a.s.l.) towards Contrada Chiappera, it is possible to observe some *Pinus halepensis* woods. This forest vegetation grows on rather steep slopes, essentially consisting of partially consolidated, frequently eroded, carbonatic screes. It develops mainly within the thermo-Mediterranean dry

to subhumid bioclimatic belt and falls within the series of *Erico multiflorae-Pineto halepensis* sigmetum, whose more mature aspect is represented by *Erico multiflorae-Pinetum halepensis*, an association renamed by Pesaresi et al. (2017), which was previously attributed by Brullo et al. (2008) to *Pistacio lentisci-Pinetum halepensis* De Marco et Caneva 1985. It is a basiphilous pine forest, rich in *Pistacia lentiscus* in the undergrowth. Small nuclei of this association that survived the deforestation are currently located in the north-eastern part of the island, encompassing Pigna and Spartivalle districts. However, most of the vegetation dominated by *Pinus halepensis* can be traced back to forest plantations carried out in the 1970s. These artificial forests turned into mature, self-reproducing naturalised woods, as can be seen along the aforesaid trails. Indeed, these reforestations show a relatively rapid recovery of *P. halepensis*, favoured by the intense dissemination that has gradually brought about its advancement in the garigues and maquis belonging to the same vegetation series.

Erico multiflorae-Pinetum halepensis (After Scuderi 2002, tab. 11, rels 1–5 sub *Pistacio lentisci-Pinetum halepensis*) – Diagnostic species: *Pinus halepensis* V, *Salvia rosmarinus* V. *Erica multiflora* IV, *Globularia alypum* V, Other species: *Pistacia lentiscus* IV, *Cistus creticus* subsp. *creticus* IV, *Coronilla valentina* subsp. *glauca* IV, *Arisarum vulgare* IV. *Carex hallerana* III, *Ruta chalepensis* I, *Daphne gnidium* I, *Micromeria graeca* subsp. *fruticulosa* I, *Leontodon tuberosus* III, *Ophrys* gr. *fusca* I, *Orchis italica* I, *Hexaphylla rupestris* I, *Colchicum cupani* I.

Syntaxonomical note – According to Pesaresi et al. (2017) and Bonari et al. (2021), the *Erico multiflorae-Pinetum halepensis* must be arranged in the order *Pinetalia halepensis* of the class *Pinetea halepensis*. It includes the vegetation dominated by *Pinus halepensis* of several localities of the Italian territory, such as Pantelleria (Brullo et al. 1977; Gianguzzi 1999a, 1999b), south-eastern Sicily (Bartolo et al. 1978, 1985), Apulia (De Marco et al. 1985), and Sardinia at Porto Pino (De Marco et al. 1985). The class-level classification of Mediterranean pine forests is still a matter of debate. An official proposal for the addition of the class *Pinetea halepensis* Bonari et Chytrý in Bonari et al. (2021) to the syntaxonomic scheme of the EuroVegChecklist (from now on EVC) (Mucina et al. 2016) was officially advanced in 2021.

Among the main reasons why the authors of the proposal consider it appropriate to place Mediterranean pine forests in a different class from *Quercetea ilicis* is that there would be a better match in remote sensing of vegetation and land-cover classifications leading to a better correspondence with the broadly used systems of habitats or forest types, which usually, in the first place distinguish between broadleaved and coniferous forests. This proposal was critically evaluated by a panel of experts selected by the European Vegetation Classification Committee who have highlighted some critical issues in the research paper (Bonari et al. 2021) where the new class *Pinetea halepensis* was proposed. Among the weak points, which according to the Commission require further study and a broader discussion within the EVC, we mention the following: i) the lack of true diagnostic species in the new class that are not already classified as characteristic species of other classes or orders, especially *Quercetea ilicis* and *Pistacio-Rhamnetalia alaterni*; ii) the inclusion in the statistical analysis of both natural pine forests and

putative old anthropogenic pine plantations, which would, at least partially, contravene the very concept of "plant community" composed of species ecologically coherent with the site where they live and distributed in the arrangement they themselves established; iii) a too broad tree layer coverage range (>15%) which in fact would lead to include different macro-vegetation types, such as forests, shrublands and (wooded) grasslands and garrigues in the same syntaxonomic class; iv) a lack of homogeneity with the current EVC framework where there are already other alliances and orders related to conifer forests that are currently classified within classes dominated by broad-leaved tree species (evergreen or deciduous). The final decision on this proposal via a vote will take place during 2023. To date, both Biondi et al. (2014) and Mucina et al. (2016) classify the *Pinus halepensis* forests characterized by a rich *Pistacio-Rhamnetalia* evergreen sclerophyllous understorey in the order *Pinetalia halepensis* and in the class *Quercetea ilicis*, due to the occurrence of several sclerophyllous shrubs of this class in the undergrowth of pine forests. Given the almost total absence on Marettimo of species of the class *Crataego-Prunetea* – as well as of *Cytisus infestus*, often dominant in the Sicilian coasts – the pine forest edge is formed by garrigues of *Micromerio fruticulosae-Ericetum multiflorae*, which are represented not only in their typical aspect, but also in the variants with *Thymbra capitata*, *Cistus monspeliensis* and *Ampelodesmos mauritanicus* framed in the alliance *Polygalo preslii-Ericion multiflorae* (class *Ononido-Rosmarinetea*). In addition to the typical stands (with *Globularia alypum* and *Coronilla valentina* subsp. *glauca*), linked precisely to the *Pinus halepensis* vegetation series – a relevé of which is reported below – a number of other variants occur on the island, in particular those with *Thymbra capitata*, *Cistus monspeliensis*, and *Ampelodesmos mauritanicus*.

Micromerio fruticulosae-Ericetum multiflorae* var. *typicum – Marettimo, Contrada Carcaredda (37°57'14"N, 12°04'34"E): 189 m, 25°, SSE, 80 m². Diagnostic species: *Salvia rosmarinus* 4, *Micromeria graeca* subsp. *fruticulosa* 1, *Erica multiflora* +, *Globularia alypum* 1, *Coronilla valentina* subsp. *glauca* +. Characteristics of alliance, order and class: *Ononis minutissima* +, *Cistus monspeliensis* 1, *Phagnalon saxatile* +, *Cistus creticus* subsp. *creticus* +. Other species: *Pistacia lentiscus* 2, *Hyparrhenia hirta* subsp. *hirta* 2, *Brachypodum retusum* 2, *Avena barbata* 2, *Scorpiurus subvillosus* 1, *Ruta chalepensis* +, *Euphorbia dendroides* +, *Catapodium rigidum* +, *Carex hallerana* +, *Coronilla scorpioides* +, *Trachynia distachya* +, *Leontodon tuberosum* +, *Linum strictum* +, *Arisarum vulgare* +, *Hypochoeris achyrophorus* +, *Melica minuta* +, *Lysimachia loeflingii* +, *Allium ampeloprasum* r, *Gladiolus byzantinus* r.

Another forest edge vegetation related to the *P. halepensis* series is represented by a low scrub of oleaster and *Pistacia lentiscus*, of which two relevés are reported below.

Oleo sylvestris-Pistacietum lentisci s.l. – Marettimo, Contrada Chiappera (37°57'33"N, 12°04'24"E): 220 m, 15°, E, 100 m². Diagnostic species: *Pistacia lentiscus* 4, Characteristics of alliance, order and class: *Euphorbia dendroides 2*, *Daphne gnidium* +, *Ruta chalepensis* +, *Arisarum vulgare* 1, *Stachys major* +, *Rubia peregrina* +, *Carex hallerana* +, Other species: *Erica multiflora* 3, *Cistus creticus* subsp. *creticus* 2, *Melica minuta* 2, *Coronilla valentina* 1, *Cistus monspeliensis* 1, *Allium subhirsutum* 1, *Salvia rosmarinus* +, *Phagnalon saxatile* +, *Ferula communis* +, *Daucus carota* +,

Sonchus tenerrimus +, *Jacobaea maritima* subsp. *sicula* +, *Poterium sanguisorba* subsp. *balearicum* +, *Ampelodesmos mauritanicus* +, *Lysimachia arvensis* r, *Dactylis glomerata* subsp. *hispanica* r, *Centranthus calcitrapae* r, *Anemone hortenis* r, *Ononis mitissima* r.

Oleo sylvestris-Pistacietum lentisci s.l. – Marettimo, near the cemetery (37°57'32"N, 12°04'40"E): 52 m, 50°, NE, 40 m². Diagnostic species: *Pistacia lentiscus* 5, Characteristics of alliance, order and class: *Euphorbia dendroides* 1, *Ruta chalepensis* 1, *Arisarum vulgare* +, *Rubia peregrina* 1. Other species: *Erica multiflora* +, *Coronilla valentina* 2, *Ferula communis* +, *Sonchus tenerrimus* +, *Jacobaea maritima* subsp. *sicula* 1, *Magydaris pastinacea* 2, *Clinopodium nepeta* +, *Brachypodium retusum* +, *Reichardia picroides* +, *Phagnalon saxatile* +, *Sonchus bulbosus* +, *Dactylis glomerata* subsp. *hispanica* +, *Galactites tomentosus* +, *Galium murale* +, *Cynoglossum creticum* +, *Melica minuta* +.

Syntaxonomical note – The maquis with *P. lentiscus* is quite widespread in the Mediterranean region, where various associations are reported, such as *Oleo-Pistacietum lentisci* Molinier 1954, *Cneoro-Pistacietum lentisci* O. Bolos et R. Molinier (1969) 1984, and *Myrto-Pistacietum lentisci* (Molinier 1954 em. O. Bolos 1962) Rivas-Martinez 1975, the latter occurring also on Marettimo.

Excursion to Marettimo II (25 April 2022): Case Romane, Mt. Falcone and north-eastern coastal stretch

Above the village of Marettimo, along the initial part of a paved track leading to the locality named Case Romane, there are compact limestone outcrops colonized by a sparse garrigue dominated by *Thymbra capitata*. This vegetation can be considered a variant of the *Micromerio fruticulosae-Ericetum multiflorae*, a relevé of which is reported below.

Micromerio fruticulosae-Ericetum multiflorae **var. with** ***Thymbra capitata*** – Slightly above the Marettimo village (37°58'04"N, 12°04'14"E): 47 m, 25°, NE, 85 m². Diagnostic species: *Thymbra capitata* 4, *Erica multiflora* 1, *Salvia rosmarinus* +, *Micromeria graeca* subsp. *fruticulosa* +. Characteristics of alliance, order and class: *Globularia alypum* 1, *Coronilla valentina* subsp. *glauca* +, *Phagnalon saxatile* +. Other species: *Pistacia lentiscus* 2, *Stachys major* 1, *Arisarum vulgare* 1, *Bituminaria bituminosa* 1, *Carlina sicula* 1, *Brachypodium distachyon* 1, *Euphorbia dendroides* +, *Jacobaea maritima* subsp. *sicula* +, *Lonicera implexa* +, *Ruta chalepensis* +, *Leontodon tuberosum* +, *Anemone hortensis* +, *Fedia graciliflora* +, *Hypochoeris achyrophorus* +, *Linum strictum* +, *Linum usitatissimum* subsp. *angustifolium* +, *Rubia peregrina* +, *Euphorbia peplis* +, *Valerianella dentata* +, *Macrobriza maxima* +, *Anthyllis vulneraria* subsp. *maura* +, *Reichardia picroides* +, *Lysimachia arvensis* +, *Daphne gnidium* +, *Olea europaea* var. *sylvestris* pl. +, *Ampelodesmos mauritanicus* +, *Poterium sanguisorba* subsp. *balearicum* +, *Ferula communis* +, *Orchis italica* +, *Pallenis spinosa* +.

Up to Case Romane (37°58'13"N, 12°03'51"E), an archaeological site where the main freshwater spring of the island gushes out, the vegetation can be referred to the *P. halepensis* forest series described in the previous itinerary. Further up, at 450–500 m a.s.l., whitin the Meso-Mediterranean sub-humid bioclimatic belt, the holm oak series

(*Pistacio lentisci-Querco ilicis* sigmetum) develops on carbonatic soils. The head of the series is represented by residual nuclei of holm oak woods (*Pistacio lentisci-Quercetum ilicis*), remnants of the intense deforestation that occurred in the past (Fig. 8d). These small forest patches, occurring also at Pianoro della Craparizza, Pizzo delle Fragole and between the localities Stincazzi and Scaturro, represent relict flaps of the primary forest, exploited in the past (up to the 1960s) for charcoal production. One of these nuclei was observed along the path, on the slope to the east of Pizzo Campana. It can be ascribed to the subassociation *arbutetosum unedonis* – one of the two recorded from the island – a relevé of which is reported below.

Pistacio lentisci-Quercetum ilicis* subass. *arbutetosum unedonis – Below Pizzo Campana (37°58'20"N, 12°03'30"E): 455 m, 25°, NE, 100 m^2. Diagnostic species: *Quercus ilex* 4, *Pistacia lentiscus* 1, *Arbutus unedo* 1. Characteristics of alliance, order and class: *Dapne gnidium* 1, *Carex hallerana* 1, *Cyclamen repandum* +, *Ruta chalepensis* +, *Rubia peregrina* +. Other species: *Erica multiflora* 4, *Salvia rosmarinus* 1, *Micromeria graeca* subsp. *fruticulosa* +, *Cistus creticus* subsp. *creticus* 1, *Jacobaea maritima* subsp. *sicula* +, *Selaginella denticulata* +, *Hypochoeris laevigata* +.

Aspects of holm oak woods with *Arbutus unedo* referred to the above-mentioned subassociation are also sporadically recorded in Sicily on leached carbonatic soils, as in the case of the cacuminal part of Monte Cofano (Gianguzzi and La Mantia 2008). On Marettimo, these holm oak woods are fringed by scrubland dominated by *P. lentiscus*, through degradation replaced by the *Cistus salviifolius* variant of the garrigue *Micromerio fruticulosae-Ericetum multiflorae*. A relevé of this garrigue, widespread over large areas in the upper part of Marettimo, is reported below.

Micromerio fruticulosae-Ericetum multiflorae* var. with *Cistus salviifolius – Below Pizzo Campana (37°58'33"N, 12°03'26"E): 480 m, 20°, NE, 85 m^2. Diagnostic species: *Cistus salviifolius* 3, *Erica multiflora* 3, *Salvia rosmarinus* 4, *Micromeria graeca* subsp. *fruticulosa* +. Characteristics of alliance, order and class: *Globularia alypum* 1, *Cistus creticus* subsp. *creticus* 1, *Fumana thymifolia* +. Other species: *Pistacia lentiscus* 1, *Arisarum vulgare* +, *Trachynia distachya* 1, *Brachypodium retusum* 1, *Allium franciniae* +, *Carex halleriana* +, *Valantia muralis* +, *Leontodon tuberosum* +, *Anemone hortensis* +, *Fedia graciliflora* +, *Hypochoeris achyrophorus* +, *Colchicum bivonae* +.

This garrigue is often compenetrated with a hemicryptophic vegetation dominated by *Brachypodium retusum*, particularly on steep stony slopes, that are covered by a vegetation similar to the one described as *Brachypodio ramosi-Cistetum cretici* from the Mt. Cofano area (Gianguzzi and La Mantia 2008; Gianguzzi et al. 2015).

In higher stands, near Pizzo Falcone, there is a holm-oak wood differentiated by the occurrence of *Daphne sericea*, a small shrub that is completely absent in Sicily, having on Marettimo the western limit of its range (Di Pietro 2001). This vegetation was described by Brullo and Marcenò (1983) as *Daphno sericeae-Quercetum ilicis* and considered the potential forest vegetation in the upper part of the island, which is linked to a regular moisture condensation regime, testified by frequent fogs. A relevé is reported below.

Daphno sericeae-Quercetum ilicis – Pizzo Falcone (37°58'41"N, 12°03'18"E): 544 m, 25°, N, 100 m^2. Diagnostic species: *Quercus ilex* 3, *Daphne sericea* 1. Characteristics

of alliance, order and class: *Pistacia lentiscus* 1, *Daphne gnidium* +, *Carex hallerana* 1, *Cyclamen repandum* 1. Other species: *Erica multiflora* 2, *Salvia rosmarinus* 1, *Cistus creticus* subsp. *creticus* 1, *Jacobaea maritima* subsp. *sicula* +, *Anemone hortensis* +.

Syntaxonomic notes – The syntaxonomic arrangement of the holm oak woodlands of the island of Marettimo represents a still unresolved problem from a nomenclatural point of view. Brullo and Marcenò (1983) validly described the association *Daphno sericeae-Quercetum ilicis*, typical of the highest areas of Marettimo, where *Quercus ilex* took advantage of the frequent occurrence of fog and westerly humid winds. Two years later, the same authors in their fundamental work on the class *Quercetea ilicis* in Sicily (Brullo and Marcenò 1985b), described for western and southern Sicily a new thermophilous association of holm oak wood named *Pistacio lentisci-Quercetum ilicis*. In this paper, the authors included the *Daphno sericeae-Quercetum ilicis* that they had previously described for Marettimo in the ecological range of *Pistacio lentisci-Quercetum ilicis*, considering the latter association as a simple variant of the newly described *Pistacio lentisci-Quercetum ilicis*. In nomenclatural terms however, this kind of downgrading is not allowed by the code of phytosociological nomenclature (ICPN, Theurillat et al. 2020). In fact, the name *Daphno sericeae-Quercetum ilicis* Brullo et Marcenò 1983 has nomenclatural priority over *Pistacio lentisci-Quercetum ilicis* Brullo et Marcenò 1985 as it was published two years earlier (principle IV of ICPN).

Clearly, the peculiar distribution range of *Daphne sericea* does not support the use of the name *Daphno-Quercetum ilicis* to represent the holm-oak woods of the whole of Sicily. In fact this species occurs on Marettimo but is missing in the rest of Sicily and in most of southern Italy. It then reappears further north along the Tyrrhenian coast from northern Campania to southern Tuscany as well as in Puglia (Gargano) and inland areas of Abruzzo and (sporadically) Molise. However, since the authors of these associations clearly stated that these two communities represent, in fact, different aspects of the same association, the name *Pistacio lentisci-Quercetum ilicis* automatically becomes the type of the earliest legitimate name (Art. 29c) that in this case is *Daphno sericeae-Quercetum ilicis*. For this reason, the name *Pistacio lentisci-Quercetum ilicis* should be considered superfluous (Art. 18b). Brullo et al. (2008) tried to resolve the issue by describing the new subassociation *Pistacio lentisci-Quercetum ilicis* subass. *daphnetosum sericeae* exclusively for the island of Marettimo. However, also in this case, since the authors chose, as nomenclatural type of the new subassociation *daphneetosum sericeae*, the same relevé (rel. 2 of tab. 6) already used by Brullo and Marcenò (1983) to typify the *Daphno sericeae-Quercetum ilicis*, there is once again a reunion of syntaxa at the same rank (*Pistacio-Quercetum* vs. *Daphno-Quercetum*), with nomenclatural priority for *Daphno sericeae-Quercetum ilicis* for the above reasons. The possible solutions to this question are essentially two. The first leads to consider the *Daphno-Quercetum ilicis* as restricted solely to Marettimo by virtue of the particular bioclimatic and biogeographic conditions that characterize this island and to separate it from the *Pistacio-Quercetum ilicis*, which is widespread in the whole of Sicily and probably in other areas of southern Italy. The second solution is to refer to Art. 52 of the 4th edition of the ICPN and to propose to the Committee for Change and Conservation of Names (CCCN) the adop-

tion of *Pistacio lentisci-Quercetum ilicis* as *nomen conservandum* over its earlier heterotypic name (syntaxonomic synonym) *Daphno sericeae-Quercetum ilicis*. While waiting for this proposal to be officially advanced and for the whole process of acceptance to be completed, the only possible syntaxonomic reference for this paper, in agreement with the ICPN, is the name *Daphno sericeae-Quercetum ilicis* Brullo et Marcenò 1984.

The summit of Pizzo Falcone (Fig. 6), sloping steeply towards the coast, dominates the whole island. The imposing cliffs on the northern side host a luxuriant rupicolous vegetation, which is also well represented elsewhere on the island (Pizzo del Capraro, Pizzo Lisandro, as well as the areas of Libbano, Bassano, Orru Chiàppara, etc.). These cliffs, especially those facing north and north-east, are rich in endemites and species of relevant taxonomic and phytogeographic value. The chasmophytic vegetation of Marettimo was referred by Brullo and Marcenò (1979) to the *Bupleuro-Scabosetum limonifoliae*, association framed into the alliance *Dianthion rupicolae* (*Asplenietalia glandulosi*, *Asplenietea trichomanis*).

Bupleuro dianthifolii-Scabiosetum limonifoliae (After Brullo and Marcenò 1983: tab. 7, rels 1–16) – Diagnostic species: *Bupleurum dianthifolium* V, *Helichrysum panormitanum* subsp. *messeriae* V, *Oncostema ughii* V, *Thymus richardii* subsp. *nitidus* II. Characteristics of alliance, order and class: *Seseli bocconei* V, *Iberis semperflorens* V, *Hexaphylla rupestris* V, *Pseudoscabiosa limonifolia* IV, *Glandora rosmarinifolia* IV, *Dianthus rupicola* subsp. *rupicola* IV, *Brassica macrocarpa* II, *Melica minuta* II, *Parietaria lusitanica* II, *Atamantha sicula* I. *Hypochoeris laevigata* IV, *Polypodium cambricum* II, *Asplenium ceterach* II, *Sedum dasyphyllum* s.l. II, *Umbilicus rupestris* I, *Ranunculus spicatus* subsp. *rupestris* I. Other species: *Erica multiflora* V, *Jacobaea maritima* subsp. *sicula* VI, *Micromeria graeca* subsp. *fruticulosa* IV, *Salvia rosmarinus* III, *Lonicera implexa* II, *Euphorbia dendroides* II, *Allium subhirsutum* II, *Hyoseris radiata* I, *Valantia muralis* I, *Cistus creticus* subsp. *eriocephalus* I, *Carex halleriana* I, *Selaginella denticulata* I, *Pistacia lentiscus* I, *Petrosedum sediforme* I, *Lagurus ovatus* subsp. *vestitus* I, *Quercus ilex* I, *Daphne sericea* I, *Lobularia maritima* I, *Galium corrudifolium* I.

Just below the summit of Pizzo Falcone (Fig. 8c), a branch of the main downhill path (37°58'41"N, 12° 03'17"E; 543 m) leads to Punta Troia (Fig. 8a). Here there are dense garrigues referable to *Micromerio fruticulosae-Ericetum multiflorae*, sometimes mixed with *Brachypodium retusum* grassland, differentiated by the occurrence of *Coronilla valentina* subsp. *glauca*, belonging to the *Coronillo glaucae-Brachypodietum retusi* (Brullo et al. 2010).

Coronillo glaucae-Brachypodietum retusi (After Brullo et al. 2010: tab. 15, rels 1–2) – Diagnostic species: *Coronilla valentina* subsp. *Glauca* 2, *Brachypodium retusum* 2. Characteristics of alliance, order and class: *Ferula communis* 2, *Ampelodesmos mauritanicus* 1, *Hyoseris radiata* 1, *Phagnalon saxatile* 1, *Hyparrthenia hirta* subsp. hirta 1, *Dactylis glomerata* subsp. *hispanica* 2, *Carlina sicula* 1. Other species: *Avena barbata* 1, *Ruta chalepensis* 1, *Cistus creticus* subsp. *eriocephalus* 2, *Micromeria fruticulosa* 2, *Arisarum vulgare* 2.

These are secondary vegetation units pertaining to the holm oak series (*Pistacio-Querco ilicis* sigmetum), as well as lower down to the *Pinus halepensis* series (*Erico multiflorae-Pino halepensis* sigmetum). While proceeding towards Contrada Rumurale, the

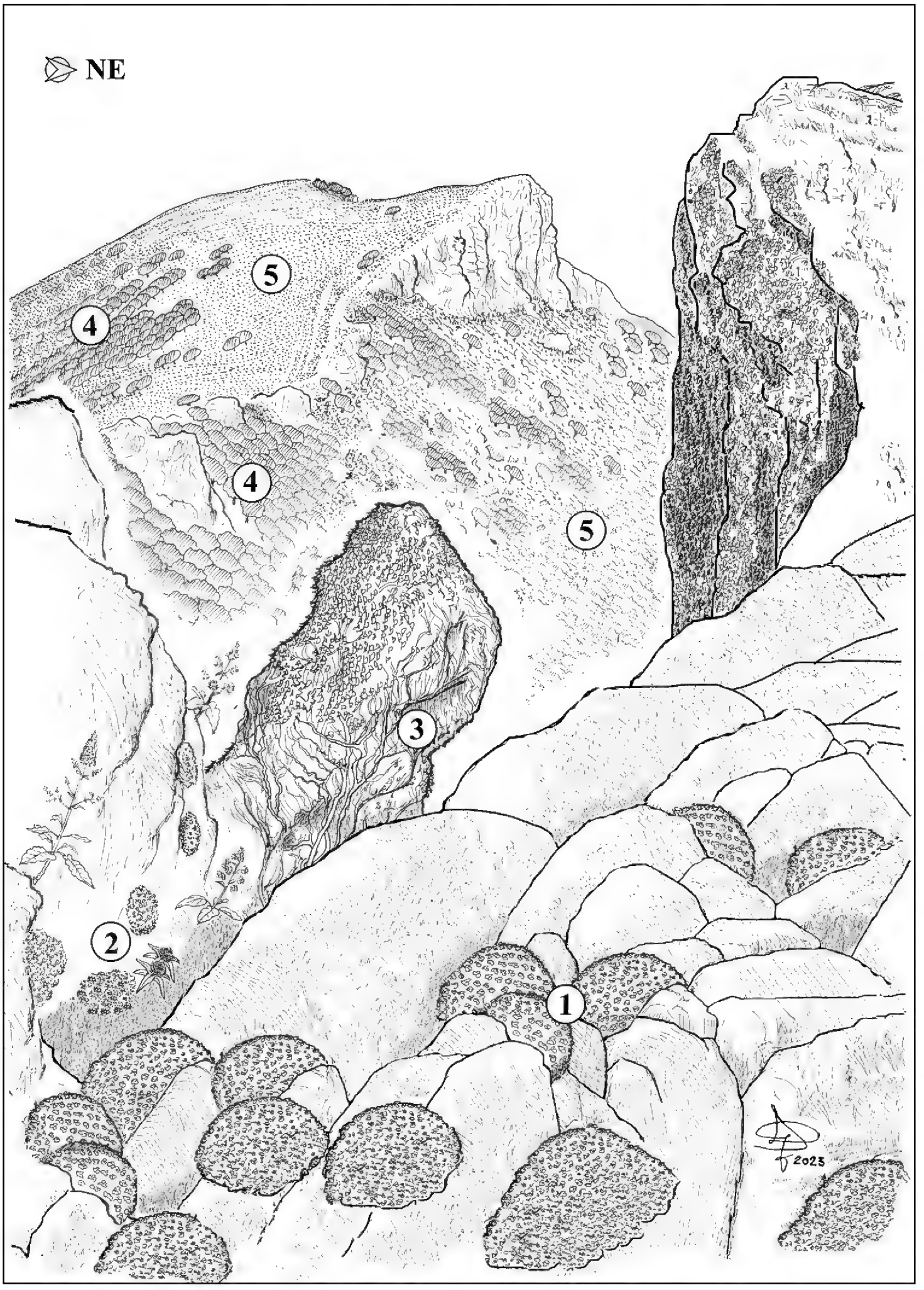

Figure 6. Marettimo Island: vegetation near the top of Monte Falcone (37°58'51"N, 12°03'06"E; 632 m a.s.l.) – **1** *Euphorbia dendroides* community; **2** *Bupleuro dianthifolii-Scabiosetum limonifoliae*; **3** *Hedera helix* community; **4** *Daphno sericeae-Quercetum ilicis* subass. *arbutetosum unedonis*; **5** *Micromerio fruticulosae-Ericetum multiflorae* var. with *Cistus salviifolius*.

path crosses the valley of the Ficarello stream, overlooked by the rocky walls of Pizzo Falcone. This scenic route leads along the ridges of Pizzo Madonnuzza and descends to Contrada Libbano, where it is possible to observe very interesting stands of chasmophytic vegetation, belonging to *Bupleuro dianthifolii-Scabiosetum limonifoliae*, notably rich in endemic species, such as *Bupleurum dianthifolium*, *Oncostema ughii* (Fig. 8b), *Thymus reichardii* subsp. *nitidus*, *Helichrysum panormitanum* subsp. *messeriae*, *Brassica macrocarpa*, *Pseudoscabiosa limonifolia*, *Hexaphylla rupestris*, *Seseli bocconei*, *Dianthus rupicola*, *Iberis semperflorens*, *and Glandora rosmarinifolia* among others.

Along the coast, the route returning to the town crosses a maquis dominated by *Euphorbia dendroides*, that can be referred to *Rhamno alaterni-Euphorbietum dendroidis* subass. *rhamnetosum oleoidis* (Fig. 7). A relevé of this vegetation is reported below.

Rhamno alaterni-Euphorbietum dendroidis* subass. *rhamnetosum oleoidis – Along the northeastern coast of Marettimo (37°58'23"N, 12°04'06"E): 27 m a.s.l., slope 18° NE, 40%, 100 m^2. Diagnostic species: *Euphorbia dendroides* 4, *Olea europaea* var. *sylvestris* 1, *Rhamnus lycioides* subsp. *Oleoides* 1. Characteristics of alliance, order and class: *Pistacia lentiscus* 3, *Lonicera implexa* 1, *Ruta chalepensis* 1, *Stachys major* +, *Arisarum vulgare* +. Other species: *Erica multiflora* 2, *Ampelodesmos mauritanicus* 2, *Allium subhirsutum* 2, *Jacobaea maritima* subsp. *sicula 2*, *Micromeria graeca* subsp. *fruticulosa* +, *Phagnalon saxatile* +, *Leontodon tuberosus* +, *Clinopodium nepeta* +, *Dactylis glomerata* subsp. *hispanica* +, *Squilla pancration* +.

Towards the sea, within halo-subhalophilous associations, such as *Limonietum tenuiculi* and *Senecioni bicoloris-Helichrysetum messerii*, an interesting ephemeral vegetation dominated by *Moraea sisyrinchium* was in full bloom at the time of our visit. Based on the relevés carried out in these stands (Table 4), it is to be referred to a new association, proposed as *Catapodio pauciflori-Moraeetum sisyrinchii* Gianguzzi, Di Pietro, Fortini, Guarino, Mei, Rosati, Spampinato, Stinca *ass. nov. hoc loco* (holotypus: Table 3, rel. 6, hoc loco), which belongs to the *Plantagini-Catapodium balearici*, an alliance of the class *Stipo-Trachynetea distachyae*. This coastal association, usually linked to outcrops of carbonate rock with shallow red soils, can be considered a geographic vicariant of the *Anthemido-Desmazerietum siculae* Brullo 1985, from north-western Sicily, and of the *Anthemido-Allietum lehmannii* Brullo et Scelsi 1998 from southern Sicily.

Catapodio pauciflori-Moraeetum sisyrinchii Gianguzzi, Di Pietro, Fortini, Guarino, Mei, Rosati, Spampinato, Stinca *ass. nov. hoc loco* (holosyntypus: Table 3, rel. 6, here designated).

Syntaxonomic framework – Class: *Stipo-Trachynietea distachyae*, order: *Stipo-Bupleuretalia semicompositi*, alliance: *Plantagini-Catapodion balearici*.

Diagnostic species – *Moraea sisyrinchium* (dom.), *Catapodium pauciflorum*, *Hyoseris baetica*, *Prospero hierae*.

Structure and ecology – Thermophilous coastal vegetation with an early spring optimum, physiognomically dominated by *Moraea sisyrinchium*, growing together with various ephemeral herbaceous plants such as *Anthemis secundiramea*, *Plantago coronopus*, *Catapodium pauciflorum*, *Bellis annua*, *Silene colorata*, *Hedypnois rhagadioloides*, *Medicago truncatula*, *Hypochoeris achyrophorus*, *Filago pygmaea*, *Plantago lagopus*,

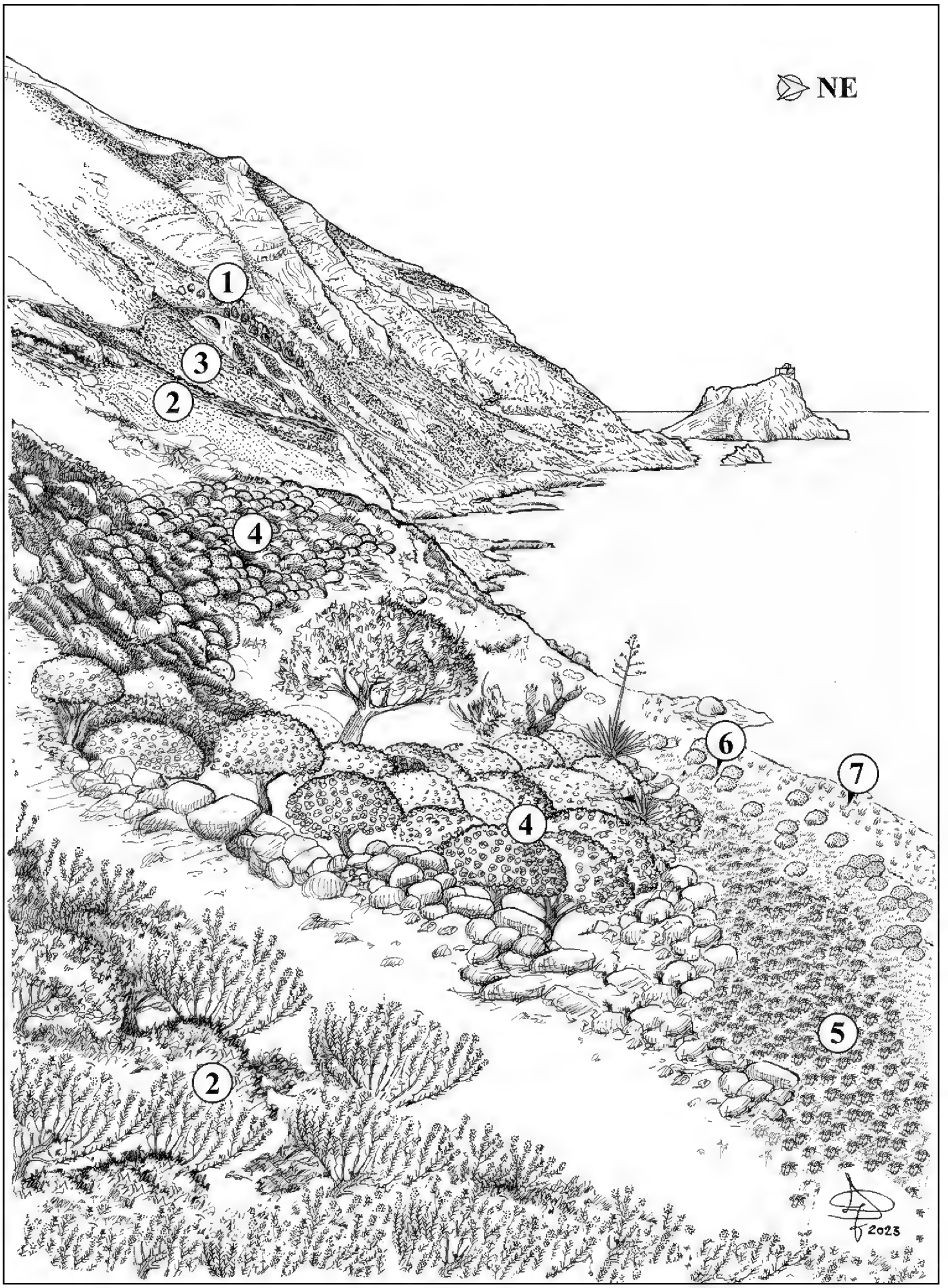

Figure 7. Marettimo Island: vegetation along the north-eastern coast, next to Case Martorana (37°58'22"N, 12°03'07"E; 21 m a.s.l.). – **1** *Erico multiflorae-Pinetum halepensis*; **2** *Coronillo glaucae-Brachypodietum retusi*; **3** *Micromerio fruticulosae-Ericetum multiflorae* var. *typicum*; **4** *Rhamno alaterni-Euphorbietum dendroidis* subass. *rhamnetosum oleoidis*; **5** *Catapodio pauciflori-Moraeetum sisyrinchii* ass. nova; **6** *Senecioni bicoloris-Helichrysetum messerii*; 7 *Limonietum tenuiculi*.

Stachys romana, *Trifolium scabrum*, *Valantia muralis*. It develops in the gaps of the sub-halophilous vegetation *Senecioni bicoloris-Helichrysetum messerii* and of the coastal garrigue, on rocky outcrops covered with shallow red soil.

Bioclimate – Dry thermo-Mediterranean.

Distribution – Marettimo, along the coast.

Syntaxonomic notes – *Moraea sisyrinchium* is a typical south Mediterranean species, widespread from the coastal territory of the Middle East to Spain. In Italy, this species occurs in southern regions and goes up along the Italian peninsula only on its western side, i.e., along the Tyrrhenian coasts of Campania, Lazio, and Tuscany. From a phytosociological point of view, Biondi et al. (2001) considered *Moraea sisyrinchium* a diagnostic species of the order *Brachypodio-Dactyletalia hispanicae* occurring as co-dominant species in the *Anthyllido vulnerariae-Kundmannietum siculae* and in the *Loto cytisoidis-Dactylidetum hispanicae* subass. *iridetosum sisyrinchi*, described from northern Sardinia. The latter exhibits a certain ecological similarity to our *Catapodio pauciflorae-Moraeetum sisyrinchii*, being both associations typical of marine terraces no longer dominated by halophilous species. However, the Sardinian association exhibits an absolute dominance of *Dactylis glomerata* subsp. *hispanica*, which is instead extremely sporadic in the communities of Marettimo. *Morea sisyrinchium* is also described as co-dominant species in the *Sileno sedoidis-Hymenolobetum revelieri*, an association referred to the ephemeral communities of *Saginetea maritimae* (*Frankenion pulverulentae*) occurring along the Ionian rocky coasts of Puglia on silty-sandy substrates and in spatial contiguity with *Crithmo-Limonietea* communities (Brullo and Giusso del Galdo 2003). The occurrence of *Silene sedoides*, *Valantia muralis* and *Parapholis incurva* and the physiognomical importance of *Plantago coronopus* and *Morea sisyrinchium* (Figs 7 and 8f) highlight similarities with the association of Marettimo, although the latter exhibits a much higher floristic richness probably due to a lower occurrence of chloride salts in the soil. Finally, *Moraea sisyrinchium* is a highly frequent species in various associations described in Sicilian coastal areas and is currently included in the alliance *Plantagini-Catapodion balearici* (order: *Stipo-Bupleuretalia semicompositi*; class: *Stipo-Trachynietea distachyae*). As regards the phytosociological classification of *Moraea sisyrinchium* in other Mediterranean countries, it must be pointed out that the association *Irido sisyrinchii-Stipetum capensis* Bolós et Molinier 1958 described for the Balearic Islands is the last stage of degradation of the Mediterranean maquis in coastal south-facing slopes affected by the moderating influence of the sea nearby (Bolós and Molinier 1958). In the southern part of the Iberian Peninsula, *Moraea sisyrinchium* is a high- frequency species in the *Spergulo fallacis-Plantaginetum ovatae* (Dana-Sanchez et al. 1999). These last two associations are framed in the alliance *Stipion retortae* (order: *Brachypodietalia distachyi*; class: *Stipo-Trachynietea distachyae*). However, *Moraea sisyrinchium* is a high-frequency species also in the *Poo bulbosae-Onobrychidetum eriophorae* Rivas Goday, Ladero et C. Rivas in Rivas Goday et Ladero 1970 and in the *Trifolio subterranei-Plantaginetum serrariae* Martín et Galán in Galán, Morales et Vicente 2000, both classified in the class *Poetea bulbosae* (Rivas-Martinez et al. 2001). In Cyprus, *Moraea sisyrinchium* occurs abundantly in the open phrygana dominated by *Sarcopoterium spinosum* (Rikli 1946).

Table 3. *Catapodio pauciflorae-Moraeetum sisyrinchii* (rel 1–6 exiting the village towards Punta Troia; rel 7–10 near the cemetery).

Relevé No.	01	02	03	04	05	06	07	08	09	10
Altitude (m a.s.l.)	12	12	12	10	10	10	5	7	8	10
Slope (%)	10	1	8	8	25	20	5	7	8	10
Aspect	N	E	E	E	N	E	N	E	E	E
Area (m^2)	4	4	4	4	4	4	4	3	4	3
Total cover (%)	50	85	95	90	90	90	90	95	85	80
Average vegetation height (cm)	9	10	13	10	12	13	10	12	12	12
Char. association										
Moraea sisyrinchium	3	4	4	4	4	4	4	4	4	3
Hyoseris baetica	+	+	1	1	1	+	+	+	+	+
Prospero hierae	+		+			+				
Char. all. *Plantagini-Catapodion balearici*										
Plantago coronopus	+	3	3	2	.	2	+	1	3	+
Catapodium pauciflorum	1	+	+	+	+	+	1	+	+	+
Bellis annua	.	.	+	+	+	.	.	+	.	+
Char. ord. *Stipo-Bupleuretalia semicompositi* and cl. *Stipo-Trachynietea distachyae*										
Silene colorata	.	1	+	1	+	1	1	1	2	+
Hedypnois rhagadioloides	1	1	.	+	1	+	+	.	+	+
Medicago truncatula	+	+	.	.	+	1	2	1	1	3
Anthemis secundiramea	.	1	+	3	+	+	1	.	+	.
Hypochoeris achyrophorus	1	.	.	.	+	+	+	1	.	+
Filago pygmaea	.	.	+	1	+	1	.	+	+	+
Trifolium scabrum	+	+	+	+	+	1	.	.	.	.
Stachys romana	+	.	+	+	+	+	.	+	.	.
Plantago lagopus	.	.	+	.	2	.	2	2	+	1
Valantia muralis	+	.	+	+	+	+	.	.	.	.
Lotus edulis	.	.	.	.	1	.	+	+		+
Trisetaria aurea	.	2	.	+	.	+	.	.	.	.
Convolvolus lineatus	.	.	.		.	.	3	2	2	
Linum strictum	+	.	.	+	.	.	.	.	.	.
Linaria reflexa	.	.	.	+	+	.	.	.	.	.
Trachynia distachya	2	.	.	.	.	.	.	.	.	.
Coronilla scorpioides	1	.	.	.	.	.	.	.	.	.
Linum usitatissimum subsp. *angustifolium*	+	.	.	.	.	.	.	.	.	.
Asteriscus aquaticus	+	.	.	.	.	.	.	.	.	.
Rumex bucephalophorus s.l.	.	.	.	.	.	+	.	.	.	.
Companions										
Triticum neglectum	1	+	1	2	1	2	+	2	1	+
Lotus cytisoides	1	2	1	+	2	2	1	.	.	1
Lolium rigidum s.l.	.	+	+	1	+	+	+	1	.	+
Daucus carota subsp. *drepanensis*	.	.	1	+	2	+	1	1	1	.
Euphorbia peplus	1	+	+	+	+	+	.	.	.	.
Reichardia picroides	.	.	1	+	1	+	+	.	.	.
Sonchus tenerrimus	.	.	.	+		+	.	+	+	+
Euphorbia segetalis	.	.	.	+	+	+	.	.	.	+
Carlina sicula	.	.	.	.	+	+	.	.	+	1
Anisantha madritensis	+	.	.	+	+	.	.	.	.	.
Lobularia maritima	.	.	.	+	+	.	+	.	.	.
Cuscuta sp.	.	.	.	.	.	.	+	+	+	.
Silene sedoides	+	.	.	.	.	.	+	.	.	.
Parapholis incurva	.	.	+	+	.	.	.	.	.	.

Relevé No.	01	02	03	04	05	06	07	08	09	10
Convolvolus althaeoides	.	.	.	.	+	.	.	.	+	.
Salvia clandestina	.	.	.	.	+	.	.	.	.	+
Dactylis glomerata subsp. *hispanica*	1	.	.	.		.	.	.	.	.
Bituminaria bituminosa	+	.	.	.	.	.	.	.	.	.
Avena barbata	+	.	.	.	.	.	.	.	.	.
Leontodon tuberosum	+	.	.	.	.	.	.	.	.	.
Lysimachia loeflingii	+	.	.	.	.	.	.	.	.	.
Orobanche minor	.	.	.	+	.	.	.	.	.	.
Medicago polymorpha	.	.	.	.	+	.	.	.	.	.
Carduus pycnocephalus	.	.	.	.	+	.	.	.	.	.
Carduus argyroa	.	.	.	.	.	.	.	.	+	.
Erodium cicutarium	.	.	.	.	.	.	.	.	.	+

Therefore, a wide range of possible interpretations for the classification of the *Catapodio pauciflorae-Moraeetum sisyrinchii* is available (see synoptic Table 4). On the other hand, this community represents a peculiar syntaxonomic issue, since, as far as we know, associations with absolute dominance of *Moraea sisyrinchium* have not been described to date.

In our opinion, the syntaxonomic classification of *Catapodio pauciflorae-Moraeetum sisyrinchii* at the class rank cannot ignore the life form spectrum of all the species that compose this association (Table 3). Therophytes prevail based on simple presence and frequency, whereas perennial species are dominant in the spectrum based on cover values. Obviously, *Moraea sisyrinchium* plays a major role in determining the largely prevailing perennial life form based on cover values. However, this dominance would be maintained (albeit only slightly) even if *Moraea sisyrinchium* had a cover-abundance index of "1" (instead of "3" or "4") testifying a non secondary role of perennial species in the community. Accordingly, the most plausible syntaxonomic solution would be to consider the *Catapodio pauciflorae-Moraeetum sisyrinchii* as putatively assignable to a class characterized by perennial communities. Having this in mind and following the EuroVegChecklist (EVC) framework (Mucina et al. 2016), we should classify this association in the class *Lygeo sparti-Stipetea tenacissimae* Rivas-Mart. 1978, in the order *Cymbopogoni-Brachypodietalia ramosi* Horvatic 1963 and in the alliance *Reichardio maritimae-Dactylidion hispanicae* Biondi et al. 2001. The latter alliance is indeed defined as including thermo-Mediterranean subhalophilous perennial grasslands in wind-swept habitats on calcareous soils of the Tyrrhenian and Ionian seas. This classification shares the one proposed by Biondi et al. (2001) for northern Sardinia where this alliance was included in the *Brachypodio-Dactylidetalia hispanicae* (syn. of *Cymbopogoni-Brachypodietalia* in EVC) but in the class *Artemisietea vulgaris*. However, the latter classification, especially if considered at the order and class ranks, would seem more appropriate for perennial communities (or mixed annual-perennial communities) dominated by cespitose hemicryptophytes (e.g., *Hyparrhenia hirta* subsp. *hirta*, *Brachypodium retusum*, *Dactylis glomerata* subsp. *hispanica*). This does not appear to be the case in Marettimo. On the other hand, the classification in the *Poetea bulbosae* does not seem plausible, at least at the biogeographic level, as this class is centered in the Iberian Peninsula. Moreover, the previously mentioned Spanish communities currently ascribed to this class are not limited to coastal districts but are widespread also in

Table 4. Simplified synoptic table of plant communities with high frequency of *Moraea sisyrinchium* from the Mediterranean region (species occurring in less than three columns are omitted, unless characteristic of the association). Cl. ***Stipo-Trachynietea*** [ord. ***Stipo-Bupleuretalia semicompositi***, all. ***Plantagini-Catapodium marini*** (1–8) and. ***Onobrychido-Ptilostemion stellati*** Brullo, Scelsi et Spampinato 2001 (9–10)]: 1) *Catapodio pauciflorae-Moraeetum sisyrinchii* ass. nova (Table 3, hoc loco); 2) *Anthemido secundirameae-Desmazerietum siculae* Brullo 1985 (after Barbagallo et al. 1979 – Sicily: Mount Cofano, sub aggr. a *A. secundiramea* and *Desmazeria sicula*); 3) *Antemido secundirameae-Allietum lehmannii* Brullo et Scelsi 1996 (after Brullo and Scelsi 1996, tab. 5, – Sicily: Vendicari and Sampieri); 4) *Onobrychido-Psiluretum incurvi* Brullo et Scelsi 1996 (after Brullo and Scelsi 1996, tab. 6 – Sicily: Vittoria, Nipitella and Castelluccio); 5) *Filagini-Daucetum lopadusani* Bartolo, Brullo, Minissale et Spampinato, 1988 (after Bartolo et al. 1988, tab. 20 – Sicily: Lampedusa Island); 6) *Allietum lojaconoi* Brullo 1985 (after Brullo 1985, tab. 9, Malta and Gozo); 7) *Allietum lojaconoi* Brullo 1985 subass. *typicum*, subass. *anthemidetosum urvilleanae* and subass. *linetosum tryginum* Brullo et al. 2020 (after Brullo et al. 2020, tab. 14.4 – Malta and Gozo); 8) *Silenetum melitensis* Brullo, Brullo, Cambria et Giusso del Galdo 2020 (after Brullo et al. 2020, tab. 14.1 – Malta, Gozo and Comino); 9) *Ptilostemono-Bupleuretum gracilis* Brullo, Scelsi et Spampinato 2001 (after Brullo et al. 2001, tab. 107 – Calabria: Aspromonte); 10) *Parapholido incurvae-Aizoetum hispanicae* Brullo, Scelsi et Spampinato 2001 (after Brullo et al. 2001, tab. 111 – Calabria: Aspromonte). Cl. ***Stipo-Trachynietea*** [ord. ***Trachynetalia distachiae*** Rivas-Martínez 1978, all. ***Trachynion distachyae*** Rivas-Mart. 1978 (11–12) and ***Stipion retortae*** O. de Bolòs 1957 (13–14)]: 11) *Vulpio ligusticae-Trisetarietum aureae* Brullo 1975 (after Brullo et al. 2020, tab. 14.2 – Malta and Gozo); 12) *Thero-Sedetum coerulei* subass. *sedetosum caespitosi* Brullo 1975 (after Brullo et al. 2020, tab. 14.1, rel. 1–14 – Gozo and Comino); 13) *Irido-Stipetum retortae* [after O. Bolòs and Molinier 1958 tab. 11 – Maiorca Island (= *Irido sisyrinchii-Stipetum capensis* O. Bolòs et Molinier 1958)]; 14) *Spergulo fallacis-Plantaginetum ovatae* Dana Sanchez, Rodriguez-Tamayo et Mota Poveda 1999 (after Dana Sanchez et al. 1999 tab. 11 – Spain: Almeria). Cl. ***Poetea bulbosae*** Rivas Goday et Rivas-Mart. in Rivas-Mart. 1978 (ord. ***Poetalia bulbosae*** Rivas Goday et Rivas-Mart. in Rivas Goday et Ladero 1970, all. ***Trifolio subterranei-Periballion minutae*** Rivas Goday 1964): 15) *Poo bulbosae-Trifolietum subterranei* subass. *plantaginetosum serrariae* Sciandrello, D'Agostino. et Minissale 2013 (after Sciandrello et al. 2013, tab. 4, rel. 20–28 – Sicily: Taormina). Cl. ***Saginetea maritimae*** Westhoff et al. 1962 (ord. ***Frankenietalia pulverulentae*** Rivas-Mart. ex Castroviejo et Porta 1976, all. ***Frankenion pulverulentae*** Rivas-Mart. ex Castroviejo et Porta 1976): 16) *Sileno sedoidis-Hymenolobetum revelieri* Brullo et Giusso 2003 (after Brullo and Giusso 2003, tab. 1 rel.1–9 – Puglia: Taranto, Lido Gandoli). Cl. ***Artemisietea vulgaris*** Lohmeyer et al. in Tx. ex von Rochow1951 (ord. ***Brachypodio ramosi-Dactyletalia hispanicae*** Biondi, Filigheddu et Farris 2001, all. ***Thero-Brachypodion ramosi*** Br.-Bl. 1925): 17) *Loto cytisoidis-Dactyletum hispanicae* subass. *dactyletosum hispanicae* Biondi, Filigheddu et Farris 2001 and subass. *iridetosum sisyrinchii* Biondi, Filigheddu et Farris 2001 (after Biondi et al. 2001, tab. 46 – Sardinia: Nurra); 18) *Anthyllido vulnerariae-Kundmannietum siculae* Biondi, Filigheddu et Farris 2001 (after Biondi et al. 2001 tab. 45 – Sardinia: Nurra).

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Number of relevés	**10**	**5**	**15**	**6**	**20**	**6**	**22**	**10**	**8**	**14**	**8**	**14**	**3**	**15**	**10**	**9**	**8**	**5**
Guide species																		
Moraea sisyrinchium	100	100	100	100	55	100	100	100	75	71	100	73	66	52	100	100	62	80
Characteristic species of association																		
Hyoseris lucida subsp. *taurina*	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Prospero hierae	30	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Desmazeria sicula	.	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Daucus carota subsp. *drepanensis*	.	100	.	.	100	.	.	.	.	.	.	.	.	.	.	.	.	.

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Number of relevés	**10**	**5**	**15**	**6**	**20**	**6**	**22**	**10**	**8**	**14**	**8**	**14**	**3**	**15**	**10**	**9**	**8**	**5**
Lonas annua	.	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Allium lehmannii	.	100	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Anthemis secundiramea	70	100	100	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Onobrychis caput-galli	.	.	20	100	.	.	.	.	5	42	.	.	.	.	.	.	.	.
Festuca incurva	.	.	.	100	.	.	.	.			.	.	.	.	.	.	.	.
Logfia lojaconoi	.	.	.	.	95	.	.	.	.	.	.	.	.	.	.	.	.	.
Diplotaxis scaposa	.	.	.	.	90	.	.	.	.	.	.	.	.	.	.	.	.	.
Linaria reflexa subsp. *lubbockii*	.	.	.	.	75	.	.	.	.	.	.	.	.	.	.	.	.	.
Allium lojaconoi	.	.	.	.		100	100	.	.	.	.	.	.	.	.	.	.	.
Linum trigynum	.	.	.	.		.	23	.	.	.	.	.	.	.	.	.	.	.
Silene melitensis	.	.	.	.		.	.	100	.	.	.	.	.	.	.	.	.	.
Bupleurum semicompositum	.	.	.	.	.	.	.		100	7	.	.	.	.	.	.	.	.
Aizoanthemopsis hispanicum	.	.	.	.	.	.	.	.	.	100	.	.	.	.	.	.	.	.
Festuca danthonii subsp. *danthonii*	.	.	.	100	.	.	.	.	25	.	100	.	.	.	.	.	.	.
Trisetaria aurea	30	.	.	.	.	49	23	.	.	.	100	27	.	.	.	.	.	.
Sedum caeruleum	.	.	.	.	.	.	.	.	.	.	.	100	.	.	.	.	.	.
Sedum caespitosum	.	.	.	.	.	.	.	.	.	.	.	47	.	.	.	.	.	.
Spergularia flaccida	.	.	.	.	.	.	.	.	.	.	.	.	.	100	.	.	.	.
Plantago ovata	.	.	.	.	.	.	.	.	.	.	.	.	.	73	.	.	.	.
Herniaria cinerea	.	.	.	.	.	.	.	.	.	.	.	.	.	73	.	.	.	.
Spergularia diandra	.	.	.	.	5	.	.	.	.	.	.	.	.	73	.	.	.	.
Poa bulbosa	.	40	.	.	.	.	27	.	25	.	50	53	.	.	100	.	.	.
Plantago serraria	.	.	.	.	.	49	54	.	.	.	.	.	.	.	100	.	.	.
Trifolium subterraneum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100	.	.	.
Onobrychis aequidentata	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100	.	.	.
Hornungia procumbens subsp. *revelierei*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100	.	.
Silene sedoides subsp. *sedoides*	20	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100	.	.
Gaudinia fragilis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	75	.
Carex flacca subsp. *erythrostachys*	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	50	80
Pancratium illyricum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	25	20
Crocus minimus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	62	.
Kundmannia sicula	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100
Anthyllis vulneraria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	100
Char. All. *Onobrychido-Ptilostemion stellati* (*) *Plantagini-Catapodion balearicae* (°) and Ord. *Stipo-Bupleuretalia semicompositi*																		
Medicago littoralis	.	80	92	.	60	100	91	100	25	92	38	27	33	26	.	.	25	.
Anisantha fasciculata subsp. *fasciculata*	.	80	59	100	60	83	62	50	100	92	.	.	.	.	20	.	.	.
Bellis annua°	50	80	59	.	.	49	45	50	.	.	25	53	33	.	.	.	.	.
Asteriscus aquaticus	10	20	92	100	100	100	49	.	.	.	.	20		19	.	.	.	.
Lagurus ovatus subsp. *vestitus*°	100	60	.	.	40	49	27	60	.	.	.	27	.	.	.	.	62	.
Catapodium balearicum°	.	100	92	.	100	100	100	100	.	.	.	100	.	.	.	100	.	.
Convolvulus lineatus	30	20	.	.	85	83	59	.	.	.	.	.	.	.	.	.	.	.
Crupina crupinastrum	.	60	.	83	.	49	14	.	.	.	.	.	33	.	.	.	.	.
Atractylis cancellata	.	100	.	.	.	.	.	.	88	28	.	.	100	32	.	.	.	.
Romulea variicolor°	.	.	.	.	.	.	91	100	.	.	50	87	.	.	.	.	.	.
Echium parviflorum	.	60	.	.	35	.	32	.	.	.	.	.	.	.	.	.	.	.
Anthemis secundiramea	.	.	.	.	.	.	36	100	.	.	.	20	.	.	.	.	.	.
Spergularia marina	.	.	.	.	.	.	14	50	.	.	.	.	.	.	.	.	.	.
*Filago eriocephala**	.	.	.	.	.	.	.	.	100	14	.	.	.	.	.	.	.	.
*Ptilostemon stellatus**	.	.	.	.	.	.	.	.	12	49	.	.	.	.	.	.	.	.

Column number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Number of relevés	**10**	**5**	**15**	**6**	**20**	**6**	**22**	**10**	**8**	**14**	**8**	**14**	**3**	**15**	**10**	**9**	**8**	**5**
Char. Cl. *Stipo-Trachynietea distachyae*																		
Brachypodium distachyon	10	100	.	49	100	100	75	40	88	71	100	53	100	6	40	.	.	.
Hypochaeris achyrophorus	60	60	79	66	75	66	49	90	38	.	62	27	100	.	70	.	.	.
Linum strictum	20	20	53	83	70	66	32	30	100	14	75	40	100	.	.	.	.	.
Euphorbia exigua subsp. *exigua*	.	40	86	83	85	49	49	.	12	14	75	47	100	6	50	.	.	.
Hedypnois rhagadioloides	.	100	66	.	50	100	62	80	12	.	25	27	33	52	20	.	.	.
Catapodium rigidum	.	80	72	.	40	100	41	40	62	14	62	53	100	.	40	.	.	.
Stipellula capensis	.	100	.	100	25	83	59	100	12	.	100	20	100	46	30	.	.	.
Trifolium scabrum	60	80	53	83	20	100	62	.	88	.	62	67	.	.	70	.	.	.
Valantia muralis	40	100	100	.	20	66	36	.	.	.	38	40	100	.	.	40	.	.
Filago pygmaea	70	100	92	.	95	49	75	.	.	.	75	73	.	.	.	10	.	.
Hyoseris scabra	.	.	13	66	55	17	36	.	12	.	50	47	.	.	70	.	.	.
Lotus edulis	40	40	.	66	45	.	32	.	12	.	50	.	33	.	.	.	.	.
Medicago minima	.	40	.	.	.	49	36	.	25	.	50	40	33	.	70	.	.	.
Plantago lagopus	60	.	.	.	.	33	27	.	.	.	88	.	33	52	20	.	.	.
Anisantha rubens	.	60	66	66	40	49	14	.	.	.	.	.	.	39	.	.	.	.
Trifolium stellatum	.	60	.	100		49	32	.	38	.	62	.	.	.	80	.	.	.
Stachys romana	60	60	.	.	70	.	18	.	.	.	.	.	66	.	50	.	.	.
Plantago afra	.	10	.	66	65	.	.	.	.	.	62	27	66	.	.	.	.	.
Medicago monspeliaca	.	.	.	.	50	17	23	.	.	.	12	47	.	19	.	.	.	.
Sedum rubens	.	60	40	.	.	49	18	.	.	.		47	.	.	.	.	.	.
Filago pyramidata	.	60	.	.	.	83	23	.	.	.	.	.	33	46	.	.	.	.
Medicago truncatula	80	.	.	.	.	66	32	.	.	.	.	47	.	.	.	.	.	.
Helianthemum salicifolium	.	80	79	.	.	.	.	.	.	.	.	.	.	13	100	.	.	.
Arenaria leptoclados subsp. *leptoclados*	.	.	.	.	.	66	18	.	.	.	12	47	.	.	.	.	.	.
Silene colorata	90	.	.	.	.	.	23	.	.	.	62	.	.	.	.	.	.	.
Rumex bucephalophorus s.l.	10	.	.	.	.	.	18	.	.	.	.	.	.	.	.	.	12	.
Ononis ornithopodioides	.	60	.	.	.	49	14	.	.	.	.	.	.	.	.	.	.	.
Sulla spinosissima	.	.	66	.	5	66		.	.	.	.	.	.	.	.	.	.	.
Char. Cl. *Saginetea maritimae*																		
Parapholis incurva	20	100	86	.	60	100	87	50	100	85	25	47	100	.	.	.	.	.
Plantago coronopus	90	100	100	.	100	100	87	100	.	.	.	53	70	26	.	.	.	.
Char. Cl. *Artemisietea vulgaris* and ord. *Brachypodio ramosi-Dactyletalia hispanicae*																		
Reichardia picroides	50	80	.	.	75	49	41	.	.	.	.	.	33	.	.	.	100	40
Dactylis glomerata subsp. *hispanica*	10	40	.	.		49	27	30	.	.	.	.	.	.	.	.	100	100
Lotus cytisoides	80	60	.	.	20	.	.	.	.	.	.	.	.	.	.	.	88	100
Convolvulus althaeoides	20	.	.	.		.	.	.	.	.	.	.	33	.	.	.	38	.
Daucus carota s.l.	.	.	.	.		49	18	.	.	.	.	.	.	.	.	.	100	.
Companions																		
Lysimachia arvensis	.	.	.	33	25	.	18	.	25	21	.	.	100	26	70	.	.	.
Triticum neglectum	100	.	.	.	.	100	23	.	.	.	25	.	.	19	60	.	.	.
Centaurium pulchellum subsp. *pulchellum*	.	80	47	.	.	83	.	30	12	.	.	.	.	.	.	.	.	.
Scorpiurus muricatus	.	.	.	.	25	17	27	.	.	.	25	.	.	6	.	.	.	.
Medicago polymorpha	10	.	.	.	.	49	14	.	.	.	38	.	.	.	.	.	.	.
Avena barbata	10	.	.	.	.	33	14	.	.	.	.	.	.	.	50	.	.	.
Lolium rigidum s.l.	80	80	.	.	.	.	.	40	12		.	.	.	.	.	.	.	.
Trigonella sulcata	.	40	.	.	.	.	.	.	62	21	12	.	.	.	.	.	.	.
Salvia verbenaca	.	.	.	49	40	.	.	.	.	.	12	.	.	6	.	.	.	.
Rostraria cristata	.	.	.	.		49	32	.	.	.	25	33	.	.	.	.	.	.
Micromeria microphylla	.	.	.	.	.	33	14	.	.	.	.	.	.	19	.	.	.	.
Arisarum vulgare subsp. *vulgare*	.	.	.	.	.		.	.	.	.	.	.	33	.	.	.	12	100

inland areas. More convincing is the choice of the alliance *Plantagini-Catapodion* and of the order *Stipo-Bupleuretalia semicompositi*. On the other hand, some critical aspects linked to the heterogeneous coenological pattern of the *Stipo-Bupleuretalia* and their inclusion in *Stipo-Trachynietea* have already been reported by Di Pietro et al. (2021) and in the same EVC the displacement of the *Stipo-Bupleuretalia* in the class *Saginetea maritimae* is suggested. However, in our opinion, the possibility to include the order *Stipo-Bupleuretalia* and related alliances in the class *Saginetea maritimae* deserves to be discussed further. As a matter of fact, a proper high-rank syntaxon to accommodate the Mediterranean plant communities dominated by small perennial species in an overall floristic context mainly characterized by therophytes is still lacking.

Excursion to Levanzo Island (26 April 2022): Levanzo, Baglio Florio, Cala Calcara, Contrada La Fossa, Pietre Varate.

The island of Levanzo (5.6 k m^2) is 12 km away from Trapani and about 4 km from Favignana. It has a morphological structure defined by faults separating two north-south trending limestone ridges, culminating respectively in the peaks named Pizzo del Monaco (278 m a.s.l.) and Pizzo del Corvo (201 m a.s.l.). Between these two peaks there is a wide depression known as La Fossa (69 m a.s.l.), once extensively cultivated. The coastline is not easily accessible, except on the north-western and south-eastern sides. Compared to the island of Marettimo, Levanzo is characterized by much drier overall environmental conditions. An intense agro-silvo-pastoral land use, performed until a few decades ago, has led to a general involution of the climactic series, partly altered by the introduction of allochthonous floristic elements.

Land use – The landscape, somewhat impoverished in its climactic vegetation, is largely dominated by open areas covered by low scrub, garrigue and grasslands, sometimes punctuated by small patches of coniferous reforestation.

Series and microgeoseries – Secondary plant communities related to the Sicilian coastal, basiphilous, infra-thermo-Mediterranean dry series (*Ruto chalepensis-Oleo sylvestris periploco angustifoliae* sigmetosum) predominate. To these aspects, some microsigmeta relating to the rocky coasts and cliffs can be added.

Endemic and rare species – The vascular flora of the island consists of 468 taxa (Romano et al. 2006). The endemic flora consists of 15 taxa, none of which is exclusive to the island, such as *Euphorbia papillaris*, *Logfia lojaconoi*, *Limonium bocconei*, *Limonium lojaconoi*, *Limonium ponzoi*, *Romulea linaresii*, *Carlina sicula* subsp. *sicula*, *Helichrysum panormitanum* subsp. *messeriae*, *Neotinea tridentata*, *Seseli bocconei*, *Dianthus rupicola* subsp. *rupicola*, *Iberis semperflorens*, *Matthiola incana* subsp. *rupestris*, *Ophrys apulica* and *Jacobaea maritima* subsp. *sicula*. Other species of phytogeographical interest include some taxa that are completely missing from Sicily (e.g., *Periploca angustifolia* and *Aristolochia navicularis*), as well as *Crocus longiflorus*, here at the westernmost limit of its distribution range. Other rare elements, occurring also in the neighbouring Trapani coast (e.g., *Rhamnus lycioides* subsp. *oleoides*, *Hypericum pubescens*), are present in the flora of Levanzo.

Figure 8. a View of the north-eastern side of Marettimo Island, with Punta Troia in the background **b** vegetation with *Oncostema ughii*, a paleoendemic species exclusively found on Marettimo **c** north-facing cliffs of Pizzo Falcone **d** residual stands of the pristine holm oak forest (*Pistacio lentisci-Quercetum ilicis*) on the slopes of Pizzo delle Fragole **e** the garrigue *Micromerio fruticulosae-Ericetum multiflorae*, widespread throughout the island **f** *Morea sisyrinchium* characterizing the *Catapodio pauciflorae-Moraeetum sisyrinchii* ass. nova.

Sampled plant communities

From the village of Levanzo, near the post office, a path leads towards Cala Fredda across a synanthropic vegetation characterized by *Agave sisalana* (Fig. 10a), a remainder of ancient plantations locally used for fibre production, that nowadays tends to be recolonised by the local maquis. Later the Baglio Florio is reached, that is a farmhouse built by the Florio family, overlooking the broad plain known as 'La Fossa', once cultivated with vineyards (Fig. 10b). From here an old path descends to the bay of Cala Calcara, crossing a wintergreen low maquis attributable to the *Periploco-Euphorbietum dendroidis* (Fig. 10c). This coenosis (of which two relevés are given below) is widespread throughout the island, and represents the climatophilous vegetation of the low and windy coasts of all the islands of the Channel of Sicily, including the Maltese Islands.

Periploco angustifoliae-Euphorbietum dendroidis – Rel. 1, La Fossa, on limestone outcrops (37°59'27"N, 12°20'37"E): 63 m, 2°, S, 100%, 100 m^2. Diagnostic species: *Pistacia lentiscus* 4, *Periploca angustifolia* 3, *Euphorbia dendroides* 1. Characteristics of alliance, order and class: *Stachys major* 2, *Olea europaea* var. *sylvestris* 1, *Rubia peregrina* +, *Rhamnus lycioides* subsp. *oleoides* +. Other species: *Oloptum miliaceum* 1, *Ferula communis* +, *Asphodelus ramosus* +, *Hyparrhenia hirta* subsp. *hirta* +, *Galactites tomentosus* +, *Allium subhirsutum* +. *Lobularia maritima* +.

Rel. 2, behind Isola, on limestone outcrops: 170 m, 5°, NNW, 100%, 100 m^2. Diagnostic species: *Pistacia lentiscus* 4, *Periploca angustifolia* 2, *Euphorbia dendroides* 3. Characteristics of alliance, order and class: *Phillyrea latifolia* 1, *Stachys major* 3, *Asparagus acutifolius* 1, *Rubia peregrina* 1, *Rhamnus lycioides* subsp. *oleoides* +, *Melica minuta* subsp. *latifolia* 2, *Arisarum vulgare* 1. Other species: *Erica multiflora* 2, *Gladiolus byzantinus* +, *Allium subhirsutum* +, *Magydaris pastinacea* +, *Squilla pancration* +, *Brachypodium retusum* 1, *Asphodelus ramosus* 1, *Dactylis glomerata* subsp. *hispanica* +, *Ammoides pusilla* +, *Jacobaea delphiniifolia* +, *Lotus edulis* +, *Crepis vesicaria* +, *Tapsia garganica* +.

Due to degradation processes, the maquis is usually replaced by a xero-thermophilous grassland attributable to *Hyparrhenietum hirto-pubescentis*, of which a relevé is reported below.

Hyparrhenietum hirto-pubescentis – Above Cala Calcara (37°59'46"N, 12°20'43"E): 58 m, 2°, S, 100%, 80 m^2. Diagnostic species: *Hyparrhenia hirta* subsp. *hirta* 5. Characteristics of alliance, order and class: *Brachypodium retusum* 3, *Squilla pancration* 1, *Convolvolus altheoides* 1, *Asphodelus ramosus* 1, *Ferula communis* +, *Mandragora autumnalis* +, *Tapsia garganica* +, *Loncomelos narbonense* +, *Magydaris pastinacea* +, *Aristolochia navicularis* +. Other species: *Smyrnium olusatrum* 2, *Trachynia distachya* 1, *Galactites tomentosus* 1, *Carlina sicula* +, *Fedia graciliflora* +, *Avena barbata* +, *Tripodion tetraphyllum* +, *Sonchus bulbosus* +, *Oxalis pes-caprae* +, *Urospermum dalechampii* +, *Scorpiurus subvillosus* +, *Sonchus tenerrimus* r, *Pistacia lentiscus* r, *Linum strictum* r, *Allium commutatum* r.

In these xeric habitats, ephemeral meadows dominated by *Stipellula capensis* are quite frequent, mainly in stands with very superficial and eroded soils. A relevé of this vegetation, belonging to the class *Stipo-Trachynetea distachyae*, is given below.

Stipelluletum s.l. – Above Cala Calcara (37°59'46"N, 12°20'42"E): 59 m, 2°, S, 95%, 80 m^2. Diagnostic species: *Stipellula capensis* 5, Characteristics of alliance, order and class: *Trachynia distachya* 1, *Trifolium stellatum* +, *Lotus edulis* +, *Hypochaeris achyrophorus* +, *Tripolium tetraphyllum* +, *Stachys romana* +, *Plantago lagopus* +, *Trifolum cherleri* r, *Linum strictum* r, *Trifolium campestre* r. Other species: *Avena sterilis* 1, *Avena barbata* 2, *Hyparrhenia hirta* subsp. *hirta* 1, *Plantago afra* 1, *Galactites tomentosus* 1, *Medicago polymorpha* 1, *Carlina sicula* subsp. *sicula* +, *Crepis vesicaria* +, *Glebionis coronaria* +, *Erodium cicutarium* +, *Scorpiurus subvillosus* r, *Nigella damascena* r, *Linum usitatissimum* subsp. *angustifolium* r, *Diplotaxis viminea* r, *Lotus corniculatus* r, *Convolvulus althaeoides* r, *Sonchus tenerrimus* r.

After crossing Piana della Fossa, the path leads to the northern part of the island, with scenic views over Cala Tramontana and Capo Grosso. In the lower part of Pizzo Monaco, all along the western slope of the island, the *Periploco-Euphorbietum dendroidis* is well represented, sometimes mixed with small reforestations of *Pinus halepensis* and xerophilous grasslands. Along this itinerary (Fig. 2), a trail descends to the famous "Grotta del Genovese", which was inhabited between 10,000 and 6,000 B.C. offering wonderfully preserved paintings and engravings dating back to the Upper Palaeolithic period. Back on the main trail, along the coastal stretch between Pietre Varate and the urban centre, it is possible to observe halophytic vegetation attributable to *Limonietum bocconei* (Fig. 9).

Excursion along the coastline of Mount Cofano (27 April 2022)

Mt. Cofano (659 m a.s.l.) is a coastal promontory with a rugged profile made up of carbonate rock, rising on the Trapani coastline, between the Cornino and Macari plains. The area falls within a Site of Community Interest and is also a Regional Nature Reserve. The area is geologically related to the Monte Sparacio-Monte Cofano and Monte Speziale-Monte Palatimone units, dating back to the Mesozoic, to which bioclastic calcarenites and conglomerates with a prevalent arenitic matrix are marginally added. It represents one of the most interesting biotopes in the western sector of Sicily, characterised by the occurrence of many naturalistic-environmental attractions. The effects of an intense anthropic pressure and wildfires have determined a deep degradation of the climactic series characterising this mountain.

Land use – The first archaeological evidence of human presence on Mt. Cofano dates back to the Upper Palaeolithic, between 14,000 and 12,000 years ago (Tusa 2001, Romano et al. 2021). Deforestation was probably an ongoing activity already in prehistoric times, leading to the current landscape physiognomy, dominated by secondary plant communities. This is the case of the low maquis dominated by *Chamaerops humilis* (locally known as 'giummarra') and the perennial dry grassland dominated by *Ampelodesmos mauritanicus* (locally known as 'disa'), both of which are typical pyrophytes, among the best adapted to the fires that, nearly every year, burn the slopes of this mountain, especially in summer (Fig. 10d). Forest rarefaction has led to the disappearance of some of the woody species recorded in the past, as in the case of *Quercus coccifera*, reported from the area by Ponzo (1900) and no longer found.

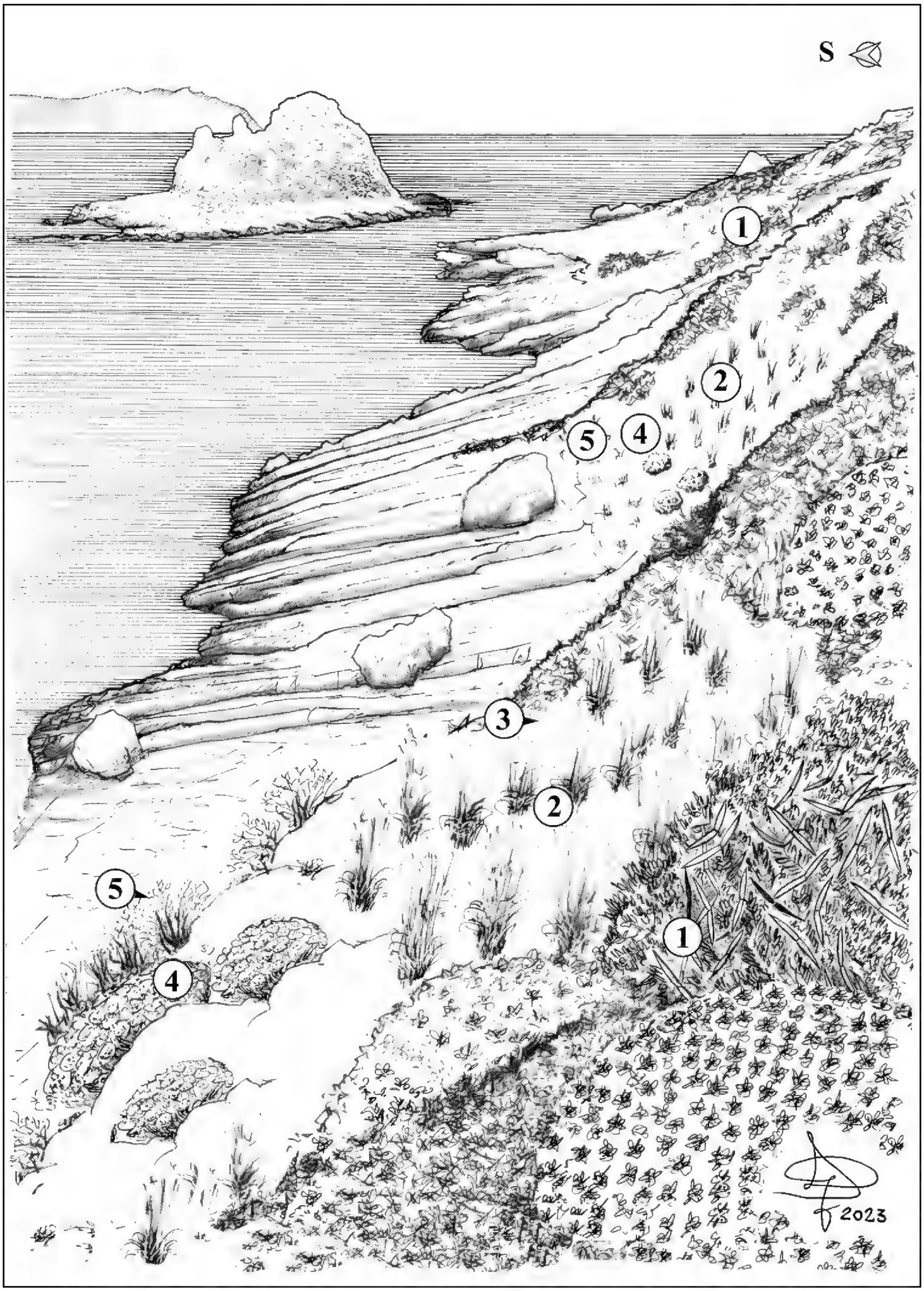

Figure 9. Levanzo Island: vegetation along the southern coast, near Cala Faraglione (37°59'12"N, 12°19'51"E; 12 m a.s.l.); in the background, Marettimo Island – **1** *Periploco angustifoliae-Euphorbietum dendroidis*; **2** *Hyparrhenietum hirto-pubescentis*; **3** *Stipelluletum* s.l.; **4** *Senecioni bicoloris-Helichrysetum messerii*; **5** *Limonietum bocconei*.

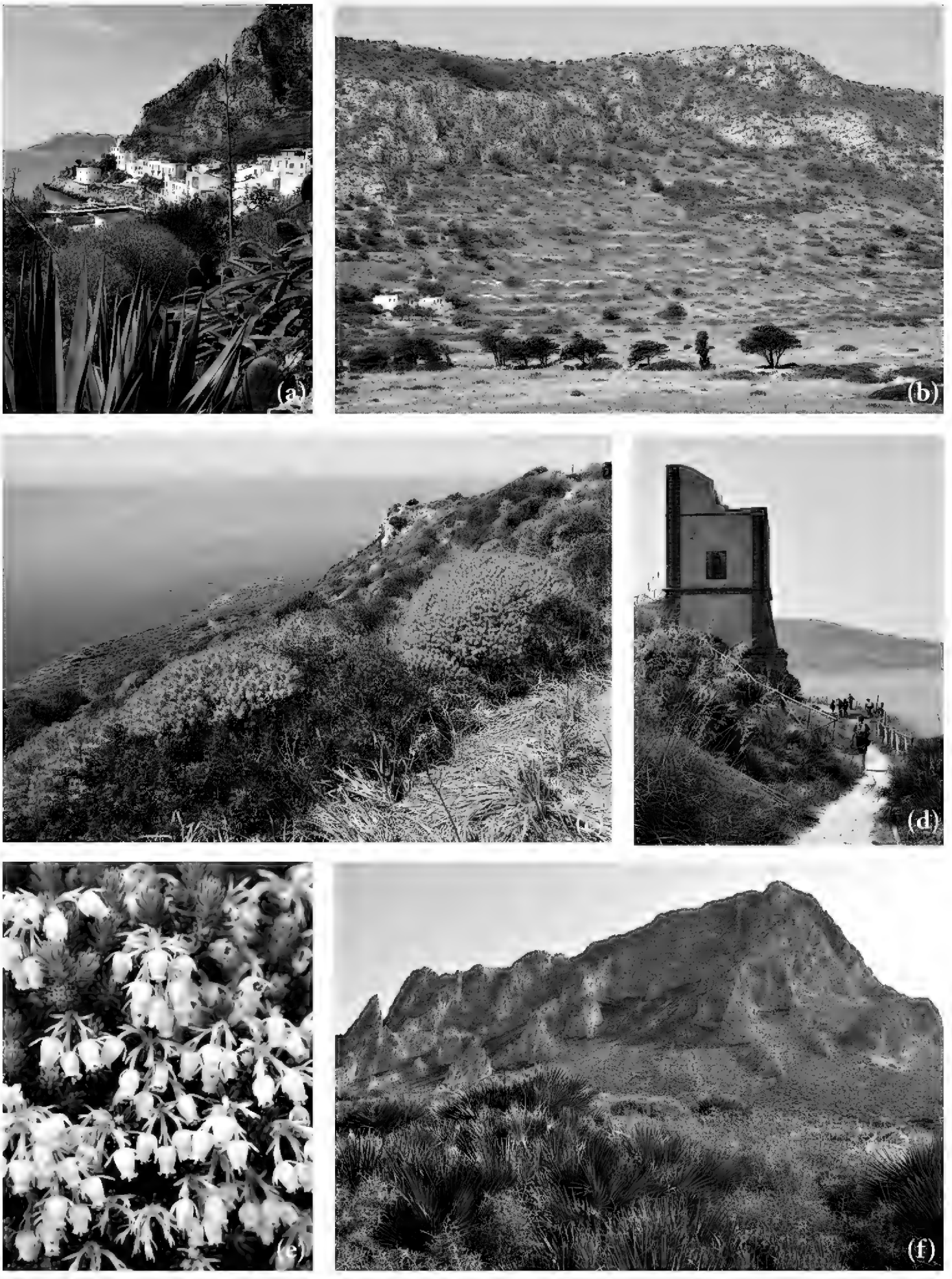

Figure 10. a *Agave sisalana* and *Selenicereus undatus*, two exotic species naturalized in the scrub near the village of Levanzo **b** view of the vegetation landscape on the island of Levanzo, between Contrada La Fossa and Pizzo Monaco **c** *Periploco-Euphorbietum dendroidis* scrub, on the western slopes of Levanzo **d** *Pistacio lentisci-Chamaeropetum humilis*, along the southwestern slope of Mt. Cofano **e** *Erica sicula*, an interesting paleoendemite exclusive to the cliffs of Mt. Cofano **f** view of the south-facing slopes of Mt. Cofano, with *Pistacio lentisci-Chamaeropetum humilis* in the foreground.

Series and microgeoseries – the series of the dwarf palm (*Pistacio lentisci-Chamaeropo humilis* sigmetum) develops along the coast of Mt. Cofano, in catenal contact with the halophytic vegetation of the alliance *Crithmo-Limonion*. Along the landward gradient, the series of the holm oak and European ash (*Rhamno alaterni-Querco ilicis pistacieto terebinthi* sigmetosum) settles on the talus slopes fringing the calcareous-dolomitic rocky faces, especially with northern orientation. The *Quercus coccifera* series (*Chamaeropo humilis-Querco calliprini* sigmetum) develops on calcarenite substrates. On compact limestone substrates with southern exposure, the dry infra-thermo-Mediterranean basiphilous series of the wild olive tree (*Ruto chalepensis-Oleo sylvestris euphorbio bivonae* sigmetosum) develops. The series of the holm oak with lentisk (*Pistacio lentisci-Querco ilicis* sigmetum) is represented on compact limestone in the highest and coolest part of Mt. Cofano, within the meso-Mediterranean subhumid bioclimate. Particularly interesting are the microgeosigmeta of the rocky coasts and cliffs, rich in endemic species which represented a main interest of this excursion.

Endemic and rare species – The vascular flora of Mt. Cofano consists of 651 taxa (Gianguzzi et al. 2006; Brullo et al. 2016), with 48 endemic taxa, three of which are exclusive, i.e., *Erica sicula* subsp. *sicula* (Fig. 10e), *Helichrysum panormitanum* subsp. *brulloi*, and *Limonium cophanense*. Other very rare endemic taxa are *Hieracium cophanense* (recorded also from Mount Passo del Lupo, within the Zingaro Nature Reserve) and *Pseudoscabiosa limonifolia* (recorded also from Marettimo Island and along the north-western promontories of Sicily, up to Palermo). Among the north-western Sicilian endemics, the following were recorded: *Brassica villosa* subsp. *drepanensis*, *Centaurea panormitana*, *C. tyrrhena*, *Limonium bocconei*, *L. ponzoi*, *Matthiola incana* subsp. *rupestris*, *Klasea flavescens* subsp. *mucronata*, etc. Several Sicilian endemics are also present, such as *Ranunculus spicatus* subsp. *rupestris*, *Seseli bocconei*, *Convolvulus cneorum var*, *cneorum*, *Eryngium tricuspidatum*, *Odontites bocconei* subsp. *bocconei*, *Neotinea commutata*, *Ophrys lacaitae*, *O. lunulata*, *O. oxyrrhynchos*, *Senecio squalidus* subsp. *microglossus* (= *S. siculus* All.). Other endemics ranging beyond the Sicilian territory include: *Orchis brancifortii*, *Antirrhinum siculum*, *Bellevalia dubia*, *Dianthus rupicola* subsp. *rupicola*, *D. siculus*, *Iberis semperflorens*, etc. Finally, some species of remarkable phytogeographical interest also occur in Mt. Cofano, such as *Glandora rosmarinifolia*, *Lonas annua*, *Rhamnus lycioides* subsp. *oleoides*, *Ranunculus baudotii*, etc.

Sampled plant communities

The itinerary starts from Contrada Macari (Fig. 2), in the south-eastern part of the Nature Reserve, up to the cliffs near the Grotta del Crocifisso (38°06'43"N, 12°39'54"E), offering numerous points of historical and natural interest (Fig. 11). Along the rocky coast, the halophilous vegetation of *Limonietum bocconei* is widespread.

Limonietum bocconei* subass. *typicum (After Gianguzzi and La Mantia 2008: tab. 6, rels 1–6) – Diagnostic species: *Limonium bocconei* V, Characteristics of alliance, order and class: *Crithmum maritimum* V, *Lotus cytisoides* V, *Pallenis maritima* V, *Silene sedoides* V, *Plantago macrorhiza IV*, *Daucus carota* subsp. *drepanensis* IV, *Senecio leucan-*

themifolius IV, *Reichardia picroides* var. *maritima* IV, *Frankenia hirsuta* III, *Arthrocaulon meridionale* I, *Limonium ponzoi* I. Other species: *Desmazeria sicula* IV, *Silene vulgaris* IV, *Anthemis secundiramea* III, *Parapholis incurva* III, *Beta vulgaris* subsp. *maritima* III, *Moraea sisyrinchium* II, *Hyoseris radiata* II, *Capparis sicula* II, *Sporobolus virginicus* II, *Dactylis glomerata* subsp. *hispanica* I, *Thymelaea hirsuta* I, *Brachypodium retusum* I, *Romulea columnae* I, *Petrosedum sediforme* I, *Catapodium balearicum* I, *Stachys romana* I, *Chamaerops humilis* I, *Dianthus rupicola* subsp. rupicola I, *Spergularia marina* I, *Medicago littoralis* I.

Another variant of the previous association is found on the imposing detrital conoids located on the northern slope of Mt. Cofano, characterized by the silvery cushions of *Helichrysum panormitanum* subsp. *brulloi*, a rupicolous species endemic to this coastal stretch. This vegetation is treated as subass. *helichrysetosum brulloi* of the *Limonietum bocconei*. It colonizes the partially eroded arid escarpments of the seaward slopes, markedly exposed to the influence of sea winds.

***Limonietum bocconei* subass. *helichrysetosum brulloi* corr.** (After Gianguzzi and La Mantia 2008: tab. 6, rels 7–12) – Diagnostic species: *Limonium bocconei* V, *Helichrysum panormitanum* subsp. *Brulloi*. Characteristics of alliance, order and class: *Crithmum maritimum* V, *Lotus cytisoides* V, *Pallenis maritima* V, *Plantago macrorhiza* V, *Daucus carota* subsp. *drepanensis* V, *Reichardia picroides* var. *maritima* V, *Frankenia hirsuta* II. Other species: *Dactylis glomerata* subsp. *hispanica* V, *Seseli bocconei* V *Silene vulgaris* V, *Thymelaea hirsuta* IV, *Hyoseris radiata* IV, *Anthemis secundiramea* III, *Brachypodium retusum* III, *Catapodium balearicum* II, *Moraea sisyrinchium* I, *Ampelodesmos mauritanicus* I, *Cytisus infestus* I, *Dactylis glomerata* subsp. *hispanica* I, *Romulea columnae* III, *Asparagus acutifolius* III, *Petrosedum sediforme* II, *Catapodium balearicum* I, *Stachys romana* II, *Arthrocaulon meridionale* II, *Chamaerops humilis* I, *Dianthus rupicola* subsp. *rupicola* I, *Erica multiflora* I, *Euphorbia segetalis* I.

The aforesaid vegetation represents the transitional aspect between the *Limonietum bocconei typicum* and the low maquis with *Chamaerops humilis* (Fig. 7), ascribed to the *Pistacio-Chamaeropetum humilis* (Fig. 10f). The latter occurs mainly on calcareous and calcarenite substrates near the coast. From these primary stands, it tends to climb along the steep talus slopes fringing the calcareous cliffs. Here it behaves as a pioneer vegetation, facilitated by the erosion of the superficial soil layers, as well as by frequent fires, that block competition with other woody species, allowing the dwarf palm to dominate the landscape. Several other thermophilous elements of the class *Quercetea ilicis* make up this coenosis, as shown in the synthetic relevé reported below.

Pistacio lentisci-Chamaeropetum humilis (After Gianguzzi and La Mantia 2008: tab. 10 rels. 1–10) – Diagnostic species: *Chamaerops humilis* V, *Pistacia lentiscus* V. Characteristics of alliance, order and class: *Asparagus albus* V, *Teucrium fruticans* IV, *Euphorbia dendroides* IV, *Stachys major* IV, *Osyris alba* III, *Rhamnus alaternus* III, *Olea europaea* var. *sylvestris* II, *Daphne gnidium* II, *Rubia peregrina* II, *Cytisus infestus* V, *Arisarum vulgare* V, *Smilax aspera* V, *Asparagus acutifolius* II, *Pistacia terebinthus* II, *Phillyrea latifolia* I. Other species: *Hyparrhenia hirta* subsp. *hirta* V, *Asphodelus ramosus* V, *Micromeria graeca* subsp. *fruticulosa* IV, *Dactylis glomerata* subsp. *hispanica* IV, *Cachrys libanotis* IV, *Reichardia pic-*

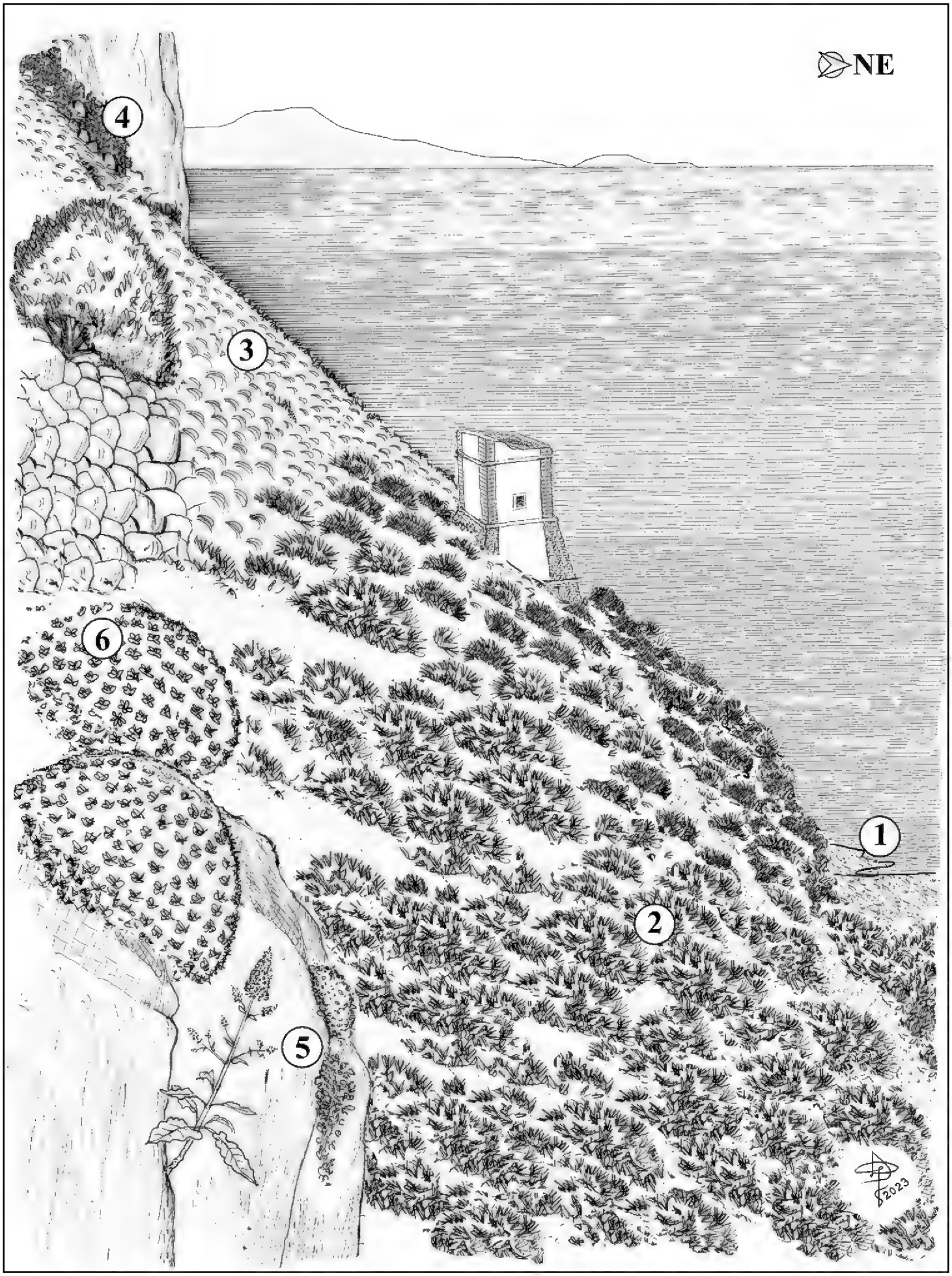

Figure 11. Vegetation along the north-western coast of Mount Cofano, next to Torre S. Giovanni (38°06'35"N, 12°39'33"E; 39 m a.s.l.); in the background, Mount San Giuliano and Levanzo Island. **1** *Limonietum bocconei*. **2** *Pistacio lentisci-Chamaeropetum humilis*; **3** *Helictotricho convoluti-Ampelodesmetum mauritanici*; **4** *Rhamno alaterni-Quercetum ilicis* subass. *pistacietosum terebinthi*; **5** *Scabioso creticae-Centauretum ucriae* subass. *typicum* and subass. *ericetosum siculae*; **6** *Rhamno-Euphorbietum dendroides* subass. *euphorbietosum bivonae*.

roides IV, *Brachypodium retusum* III, *Ampelodesmos mauritanicus* III, *Carlina gummifera* III, *Lotus citysoides* III, *Convolvolus cantabrica* III, *Pallenis spinosa* III, *Thymelaea hirsuta* III, *Petrosedum sediforme* II, *Squilla pancration* II, *Bituminaria bituminosa* II, *Pallenis maritima* II, *Anthyllis vulneraria* subsp. *maura* II, *Salvia verbenaca* II, *Oloptum miliaceum* II, *Anethum foeniculum* II, *Lobularia maritima* II, *Ambrosinia bassii* II, *Romulea columnae* II, *Lotus tetragonolobus* II, *Helichrysum panormitanum* subsp. *brulloi* I, *Carex flacca* subsp. *erythrostachys* I, *Cynodon dactylon* I, *Daucus carota* subsp. *hispanicus* I, *Eryngium campestre* I, *Biscutella maritima* I, *Convolvolus altheoides* I, *Rubus ulmifolius* I, *Carlina sicula* I, *Moraea sisyrinchium* I, *Thapsia garganica* I, *Urospermum picroides* I, *Kundmannia sicula* I.

The clastic slopes developing at the base of the cliffs of Mt. Cofano, especially near the rocky outcrops, in relatively cooler and shadier conditions, belong to the holm oak series with manna ash (*Rhamno alaterni-Querco ilicis pistacietosum terebinthi* sigmetum). Frequent fires have led to the almost total disappearance of the more evolved forest aspects of this series, leaving room for secondary aspects and, in particular, for the perennial grassland dominated by *Ampelodesmos mauritanicus*, here represented by the *Helictotricho convoluti-Ampelodesmetum mauritanici*.

Helictotricho convoluti-Ampelodesmetum mauritanici (After Gianguzzi and La Mantia 2008: tab. 20, rels. 1–8) – Diagnostic species: *Ampelodesmos mauritanicus* V, *Klasea flavescens* subsp. *mucronata* III, *Eryngium tricuspidatum* subsp. *bocconei* III, *Helictochloa cincinnata* III, *Delphinium emarginatum* III, *Helminthotheca aculeata* III, *Dianthus siculus* II, *Gelasia villosa* subsp. *columnae* I, *Pimpinella anisoides* I. Characteristics of alliance, order and class: *Hyparrhenia hirta* s.l. V, *Dactylis glomerata* subsp. *hispanica* V; *Asphodelus ramosus* V, *Andropogon distachyus* IV, *Convolvolus altheoides* IV, *Bituminaria bituminosa* IV, *Kundmannia sicula* III. *Reichardia picroides* II, *Hyoseris radiata* II, *Lathyrus clymenum* II, *Anethum piperitum*, *Micromeria graeca* II, *Anthyllis vulneraria* subsp. *maura* II, *Lobularia maritima* II, *Convolvolus cantabrica* II, *Verbascum sinuatum* II, *Phagnalon saxatile* II, *Ferula communis* I, *Thapsia garganica* I, *Pallenis spinosa* I, *Scolymus grandiflora* I, *Poterium sanguisorba* subsp. *balearicum* I. Other species: *Chamaerops humili* subsp. *humilis* V, *Carlina sicula* V, *Pistacia lentiscus* IV, *Stachys major* IV, *Brachypodium retusum* IV, *Micromeria graeca* subsp. *fruticulosa* IV, *Cytisus infestus* III, *Asparagus albus* III, *Stachys romana* III, *Urospermum dalechampii* III, *Melica minuta* III, *Macrobriza maxima* III, *Linum trigynum* III, *Erica multiflora* II, *Carlina gummifera* II, *Hypericum perfoliatum* II, *Linum strictum* II, *Daucus carota* II, *Fumana thymifolia* II, *Pistacia terebinthus* II, *Teucrium fruticans* I, *Asparagus acutifolius* I, *Squilla pancration* I, *Lotus cytisoides* I, *Scorpiurus subvillosus* I, *Hyoseris radiata* I.

The most structured seral stage occurring on the slopes near the cliffs must be referred to a holm oak wood, in which two deciduous trees, *Fraxinus ornus* and *Pistacia terebinthus*, play an important physiognomic role, as differential species of the *Rhamno alaterni-Quercetum ilicis pistacietosum terebinthi*, a woodland nowadays represented by small residual patches.

Rhamno alaterni-Quercetum ilicis* subass. *pistacietosum terebinthi (After Gianguzzi and La Mantia 2008: tab. 13, rels. 1–7) – Diagnostic species: *Quercus ilex* V, *Pistacia terebinthus* V, *Fraxinus ornus* V, *Rhamnus alaternus* V, *Rhus coriaria* II. Characteristics

Table 5. Syntaxonomic scheme.

CRITHMO-LIMONIETEA Br.-Bl.1947 in Br.-Bl., Roussine et Nègre 1952
CRITHMO-LIMONIETALIA Molinier 1934
Crithmo-Limonion Molinier 1934
Limonietum bocconei Barbagallo, Brullo et Guglielmo 1979 subass. *typicum*
subass. *helichrysetosum cophanense* Gianguzzi et La Mantia 2008
Limonietum tenuiculi Brullo et Marcenò 1983
Plantagini-Thymelaeion hirsutae Bartolo et Brullo in Bartolo et al. 1992
Anthyllidion barbae-jovis Brullo et De Marco 1989
Senecioni bicoloris-Helichrysetum messerii Brullo et Marcenò 1983
SALICORNIETEA FRUTICOSAE Br.-Bl. et Tx. ex A. Bolòs y Vayreda et O. de Bolòs in A. Bolòs y Vayreda 1950
SARCOCORNIETALIA FRUTICOSAE Br.-Bl.1933
Juncion maritimi Br.-Bl. ex Horvatic 1934
Agropyro scirpei-Inuletum crithmoidis Brullo in Brullo et al.1988
ASPLENIETEA TRICHOMANIS (Br.-Bl. in Meier et Br.-Bl. 1934) Oberd. 1977
ASPLENIETALIA GLANDULOSI Br.-Bl. in Meier et Br.-Bl. 1934
Dianthion rupicolae Brullo et Marcenò 1979
Scabioso creticae-Centauretum ucriae Brullo et Marcenò 1979
– subass. *typicum* Brullo et Marcenò 1979
– subass. *ericetosum siculae* Brullo et Marcenò 1979
Bupleuro dianthifolii-Scabiosetum limonifoliae Brullo et Marcenò 1979
CYMBALARIO-PARIETARIETEA JUDAICAE Oberd. 1969
TORTULO-CYMBALARIETALIA Segal 1969
Parietarion judaicae Segal 1969
Athamanto siculae-Parietarietum judaicae Gianguzzi et Bazan 2020
PINETEA HALEPENSIS Bonari et Chytrý in Bonari et al. 2021
(currently sub-judice by the European Vegetation Classification Committee)
PINETALIA HALEPENSIS Biondi, Blasi, Galdenzi, Pesaresi et Vagge in Biondi et al. 2014
Pistacio lentisci-Pinion halepensis Biondi, Blasi, Galdenzi, Pesaresi et Vagge in Biondi et al. 2014
Erico multiflorae-Pinetum halepensis (Brullo, Di Martino et Marcenò 1977) Biondi et Pesaresi 2017 in Biondi et al. 2017(= *Pistacio lentisci-Pinetum halepensis* De Marco et Caneva 1985)
QUERCETEA ILICIS Br.-Bl.1947
QUERCETALIA ILICIS Br.-Bl.1936 em. Rivas-Martínez 1975
Fraxino orni-Quercion ilicis Biondi, Casavecchia et Gigante in Biondi et al. 2013
Rhamno alaterni-Quercetum ilicis Brullo et Marcenò 1985
subass. *pistacietosum terebinthi* Gianguzzi, Ilardi et Raimondo 1996
Pistacio lentisci-Quercetum ilicis Brullo et Marcenò 1985 subass. *typicum*
subass. *arbutetosum unedonis* Gianguzzi et La Mantia 2008
Daphno sericeae-Quercetum ilicis Brullo et Marcenò 1984
Asparago acutifolii-Laurion nobilis Gianguzzi, P. Cuttonaro, Cusimano et Romano. 2016
Acantho mollis-Lauretum nobilis Gianguzzi, D'Amico et Romano 2010
PISTACIO LENTISCI-RHAMNETALIA ALATERNI Rivas-Martínez 1975
Oleo sylvestris-Ceratonion siliquae Br.-Bl. 1936 em. Rivas-Martínez 1975
Pistacio lentisci-Chamaeropetum humilis Brullo et Marcenò 1985
Periploco angustifoliae-Euphorbietum dendroidis Brullo, Di Martino et Marcenò 1977
Rhamno alaterni-Euphorbietum dendroidis Géhu et Biondi 1997
subass. *rhamnetosum oleoidis* (Brullo et Marcenò 1985) Gianguzzi, Cutton, Cusim. et Romano 2016
subass. *euphorbietosum bivonae* (Gianguzzi, Ilardi et Raimondo 1996) Gianguzzi, Cutton., Cusim. et Romano 2016
Pyro amygdaliformis-Calicotometum infestae Gianguzzi et La Mantia 2008
Ruto chalepensis-Oleetum sylvestris Gianguzzi et Bazan 2020
subass. *euphorbietosum bivonae* Gianguzzi et Bazan 2020

subass. *rhamnetosum oleoidis* Gianguzzi et Bazan 2020
subass. *periplocetosum angustifoliae* Gianguzzi et Bazan 2020
CRATAEGO-PRUNETEA Tüxen 1962
PYRO-SPINOSAE-RUBETALIA ULMIFOLII Biondi, Blasi et Casavecchia in Blasi et al. 2014
Pruno spinosae.Rubion ulmifolii O.Bolòs 1954
Clematido cirrhosae-Rubetum ulmifolii Gianguzzi et La Mantia 2008
ONONIDO-ROSMARINETEA Br.-Bl. in A. Bolòs y Vayreda 1950
ROSMARINETALIA OFFICINALIS Br.-Bl. ex Molinier 1934
Poligalo preslii-Ericion multiflorae Guarino et Pasta 2017
Micromerio fruticulosae-Ericetum multiflorae Brullo et Marcenò 1983
Brachypodio ramosi-Cistetum creticae Gianguzzi et La Mantia 2008
LYGEO SPARTI-STIPETEA TENACISSIMAE Rivas-Martínez 1978
CYMBOPOGONO-BRACHYPODIETALIA RAMOSI Horvatić1963
Phlomido lychnitidis-Brachypodion retusi Mateo ex Theurillat et Mucina 2016
Coronillo glaucae-Brachypodietum retusi C. et S. Brullo, Giusso et Tomaselli 2006
Helminthotheco aculeatae-Brachypodietum retusi C. et S. Brullo, Giusso et Tomaselli 2006
HYPARRHENIETALIA HIRTO-PUBESCENTIS Rivas-Martínez 1978
Saturejo-Hyparrhenion hirtae O. de Bolòs 1961
Hyparrhenietum hirto-pubescentis s.l. A.et O. de Bolòs et Br.-Bl. 1950
Avenulo-Ampelodesmion mauritanici Minissale 1995
Helictotricho convoluti-Ampelodesmetum mauritanici Minissale 1995
ONOPORDETEA ACANTHII Br.-Bl. 1964
CARTHAMETALIA LANATI Brullo in Brullo et Marcenò 1985
Onopordion illyrici Oberd. 1954
Carlino siculae-Feruletum communis Gianguzzi, Ilardi et Raimondo 1996
GALIO-URTICETEA Passarge ex Kopecky 1969
GALIO APARINES-ALLIARIETALIA PETIOLATAE Görs et Müller 1969
Galio-Alliarion petiolatae Oberdorfer et Lohmeyer in Oberd., Görs, Korneck, Lohm., Müller, Philippi et Seibert 1967
Smyrnienion olusatri Rivas Goday ex Rivas-Martinez, Fernàndez-Gonzàlez et Loidi 1999
Acantho-Smyrnietum olusatri Brullo et Marcenò 1985
STIPO-TRACHYNIETEA DISTACHYAE Brullo in Brullo, Scelsi et Spampinato 1998
TRACHYNETALIA DISTACHYAE Rivas-Martinez 1978
Trachynion distachyae Rivas-Martínez 1978 Brullo in Brullo et al. 2020
Thero-Sedetum caerulei Brullo 1975
Stipion retortae O. de Bolòs 1957
Ononido breviflorae-Stipetum capensis Brullo, Guarino et Ronsisvalle 1998
STIPO-BUPLEURETALIA SEMICOMPOSITI Brullo in Brullo, Scelsi et Spampinato 2001
Plantagini-Catapodion balearici Brullo 1985 corr. Guarino et Pignatti 2019
Anthemido intermediae-Desmazerietum siculae Brullo 1985
Catapodio pauciflorae-Moraeetum sisyrinchii ass. nova hoc loco

of alliance, order and class: *Cyclamen hederifolium* V, *Allium subhirsutum* V, *Asparagus acutifolius* V, *Smilax aspera* IV, *Rubia peregrina* IV, *Clematis cirrhosa* IV, *Rosa sempervirens* IV, *Euphorbia characias* III, *Asplenium onopteris* II, *Ruta chalepensis* II, *Daphne gnidium* I, *Teucrium flavum* V, *Euphorbia dendroides* II, *Stachys major* II, *Osyris alba* II, *Arisarum vulgare* IV, *Carex distachya* II, *Ruscus aculeatus* II, *Phillyrea latifolia* II, *Hedera helix* V. Other species: *Acanthus mollis* V, *Rubus ulmifolius* IV, *Arum italicum* IV, *Polypodium cambricum* IV, *Anthriscus nemorosa* IV, *Ampelodesmos mauritanicus* III, *Geranium lucidum* III,

Helminthotheca aculeata III, *Oxalis pes-caprae* II, *Brachypodium retusum* II, *Centranthus ruber* II, *Clinopodium nepeta* II, *Athamanta sicula* II, *Lathyrus oleraceus* subsp. *biflorus* I, *Dryopteris villarii* subsp. *pallida* I, *Galium aparine* I, *Umbilicus horizontalis* I, *Theligonum cynocrambe* I, *Crataegus monogyna* I. *Carex divisa* I, *Anemone hortensis* I, *Convolvulus silvaticus* I, *Hypericum perfoliatum* I, *Geranium purpureum* I. *Thapsia asclepium* I.

The rupestrian habitat is particularly well represented in the Mt. Cofano area, especially along the northern slopes, where the calcareous cliffs are more than 300 m high. On these cliffs, chasmophytic vegetation of the *Scabioso-Centauretum ucriae* subass. *typicum* and subass. *ericetosum siculae*, as well as comophilous, therophytic and bryophytic communities occur.

Scabioso creticae Centauretum ucriae (After Gianguzzi and La Mantia 2008: tab. 7, rels. 1–10) – Diagnostic species subass. *typicum*: *Centaurea panormitana* V, *Brassica villosa* subsp. *bivoniana* V, *Matthiola incana* subsp. *rupestris* V, *Convolvulus cneorum* II, *Brassica villosa* subsp. *drepanensis* I. Diagnostic species subass. *ericetosum siculae*: *Helichrysum panormitanum* subsp. *brulloi* V, *Erica sicula* II, *Pseudoscabiosa limonifolia* II, *Hieracium cophanense* II, *Phagnalon rupestre* I. Characteristics of alliance, order and class: *Silene fruticosa* V, *Seseli bocconei* V, *Dianthus rupicola* subsp. *rupicola* V, *Iberis semperflorens* IV, *Hexaphylla rupestris* IV, *Euphorbia bivonae* III, *Glandora rosmarinifolia* II, *Pimpinella anisoides* I, *Antirrhinum siculum* I, *Odontites bocconei* subsp. *bocconei* I, *Lomelosia cretica* IV, *Polypodium cambricum* III, *Melica minuta* III, *Asplenium ceterach* III, *Athamanta sicula* II, *Hypochoeris laevigata* II, *Sedum dasyphyllum* II. *Pseudodictamnus hispanicus* II, *Capparis orientalis* II, *Umbilicus horizontalis* II, *Parietaria lusitanica* I, *Asplenium trichomanes* subsp. *quadrivalens* I, *Ranunculus spicatus* subsp. *rupestris* I, *Teucrium flavum* I. Other species: *Euphorbia dendroides* III, *Stachys major* II, *Ruta chalepensis* II, *Ampelodesmos mauritanicus* II, *Chamaerops humilis* II, *Asparagus albus* II, *Ephedra* sp. I, *Micromeria graeca* subsp. *fruticulosa* V, *Galium lucidum* IV, *Coronilla valentina* subsp. *glauca* III, *Brachypodium retusum* III, *Hyoseris radiata* III, *Erica multiflora* II, *Lotus cytisoides* II, *Lobularia maritima* II, *Petrosedum sediforme* II, *Centranthus ruber* I, *Malva arborea* I, *Oloptum miliaceum* I, *Phagnalon rupestre* I.

Floristic remarks

The research led to the identification of 423 taxa of vascular plants, of which 100 in Mt. San Giuliano (including 53 taxa documented by herbarium specimens: Suppl. material 1), 201 in Marettimo Island (including 93 taxa documented by herbarium specimens: Suppl. material 2), 137 in Levanzo Island (including 79 taxa documented by herbarium specimens; Suppl. material 3), and 220 in Mt. Cofano (including 77 taxa documented by herbarium specimens, Suppl. material 4). In all the aforementioned study areas, the Asteraceae was the most represented family with 12, 27, 26 and 32 taxa, respectively.

With regards to Marettimo, four taxa were found to be new floristic records: *Ervum pubescens*, *Fumana laevis*, *Kalanchoë ×houghtonii*, *Lysimachia loeflingii* and *Medicago littoralis*. In particular, *L. loeflingii*, a species recently described and known in Italy only for

Sardinia (Jiménez-López et al. 2022), is recorded for the first time in Sicily. Our discovery of *M. littoralis* is a confirmation for the flora of the island as it was formerly reported by Francini and Messeri (1956), but not subsequently confirmed (Gianguzzi et al. 2006). A potential threat to the native flora of the island is the finding of *K.* ×*houghtonii*, an artificial hybrid created in the 1930s in the USA by experimental crossings between *K. daigremontiana* Raym.-Hamet & H.Perrier and *K. delagoënsis* Eckl. & Zeyh., considered one of the most rapidly expanding invasive plants in recent times (Herrando-Moraira et al. 2020). For example, in Italy it was recently indicated as invasive in Calabria (Stinca et al. 2022). Moreover, further four taxa were found by us for the first time in Levanzo (i.e., *Avena sterilis* subsp. *sterilis*, *Blackstonia perfoliata* subsp. *intermedia*, *Catapodium rigidum* subsp. *majus*, *Hyparrhenia sinaica*, *Oxalis corniculata*, *Phagnalon rupestre* subsp. *rupestre* and *Scorpiurus subvillosus*) and three new taxa in Mt. Cofano (i.e., *Blackstonia grandiflora*, *Carex divulsa* and *Galium lucidum* subsp. *venustum*). Among these taxa, very interesting is the discovery of *H. sinaica*, a SW-Steno-Mediterranean species very similar to *H. hirta* subsp. *hirta* from which it is distinguished by a few characters concerning the peduncles and the bracts of the inflorescences (Pignatti et al. 2017–2019).

In agreement with the results achieved by other Working Groups of the Italian Botanical Society in southern Italy (e.g., Rosati et al. 2017, Stinca et al. 2019), data obtained during this study, confirmed the important role of a collaborative approach among botanists, especially among specialists in vascular flora and vegetation, aimed at the analysis of the plant diversity of the Italian territory.

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Supplementary material 1

List of collected specimens (*) from Mt. San Giuliano and/or taxa quoted in the text

Authors: Lorenzo Gianguzzi, Riccardo Guarino, Giuseppe Bazan, Romeo Di Pietro, Alicia Teresa Rosario Acosta, Enrico Bajona, Peter Bolliger, Costantino Bonomi, Adriano Camuffo, Carlo Console, Simonetta Fascetti, Paola Fortini, Annarita Frattaroli, Giacomo Mei, Fabio Mondello, Silvia Olivari, Masin Rizzieri, Leonardo Rosati, Simona Sarmati, Leonardo Scuderi, Marco Simonazzi, Giovanni Spampinato, Lucia Viegi, Adriano Stinca

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Supplementary material 2

List of collected specimens (*) from Marettimo Island and/or taxa quoted in the text

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Supplementary material 3

List of collected specimens (*) from Levanzo Insland and/or taxa quoted in the text

Authors: Lorenzo Gianguzzi, Riccardo Guarino, Giuseppe Bazan, Romeo Di Pietro, Alicia Teresa Rosario Acosta, Enrico Bajona, Peter Bolliger, Costantino Bonomi, Adriano Camuffo, Carlo Console, Simonetta Fascetti, Paola Fortini, Annarita Frattaroli, Giacomo Mei, Fabio Mondello, Silvia Olivari, Masin Rizzieri, Leonardo Rosati, Simona Sarmati, Leonardo Scuderi, Marco Simonazzi, Giovanni Spampinato, Lucia Viegi, Adriano Stinca

Data type: table (.pdf file)

Link: https://doi.org/10.3897/italianbotanist.16.103989.suppl3

Supplementary material 4

List of collected specimens (*) from Mt. Cofano and/or taxa quoted in the text

Authors: Lorenzo Gianguzzi, Riccardo Guarino, Giuseppe Bazan, Romeo Di Pietro, Alicia Teresa Rosario Acosta, Enrico Bajona, Peter Bolliger, Costantino Bonomi, Adriano Camuffo, Carlo Console, Simonetta Fascetti, Paola Fortini, Annarita Frattaroli, Giacomo Mei, Fabio Mondello, Silvia Olivari, Masin Rizzieri, Leonardo Rosati, Simona Sarmati, Leonardo Scuderi, Marco Simonazzi, Giovanni Spampinato, Lucia Viegi, Adriano Stinca

Data type: table (.pdf file)

Link: https://doi.org/10.3897/italianbotanist.16.103989.suppl4

Supplementary material 5

Taxa with authors' names listed in Table 4

Authors: Lorenzo Gianguzzi, Riccardo Guarino, Giuseppe Bazan, Romeo Di Pietro, Alicia Teresa Rosario Acosta, Enrico Bajona, Peter Bolliger, Costantino Bonomi, Adriano Camuffo, Carlo Console, Simonetta Fascetti, Paola Fortini, Annarita Frattaroli, Giacomo Mei, Fabio Mondello, Silvia Olivari, Masin Rizzieri, Leonardo Rosati, Simona Sarmati, Leonardo Scuderi, Marco Simonazzi, Giovanni Spampinato, Lucia Viegi, Adriano Stinca

Data type: table (.docx file)

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